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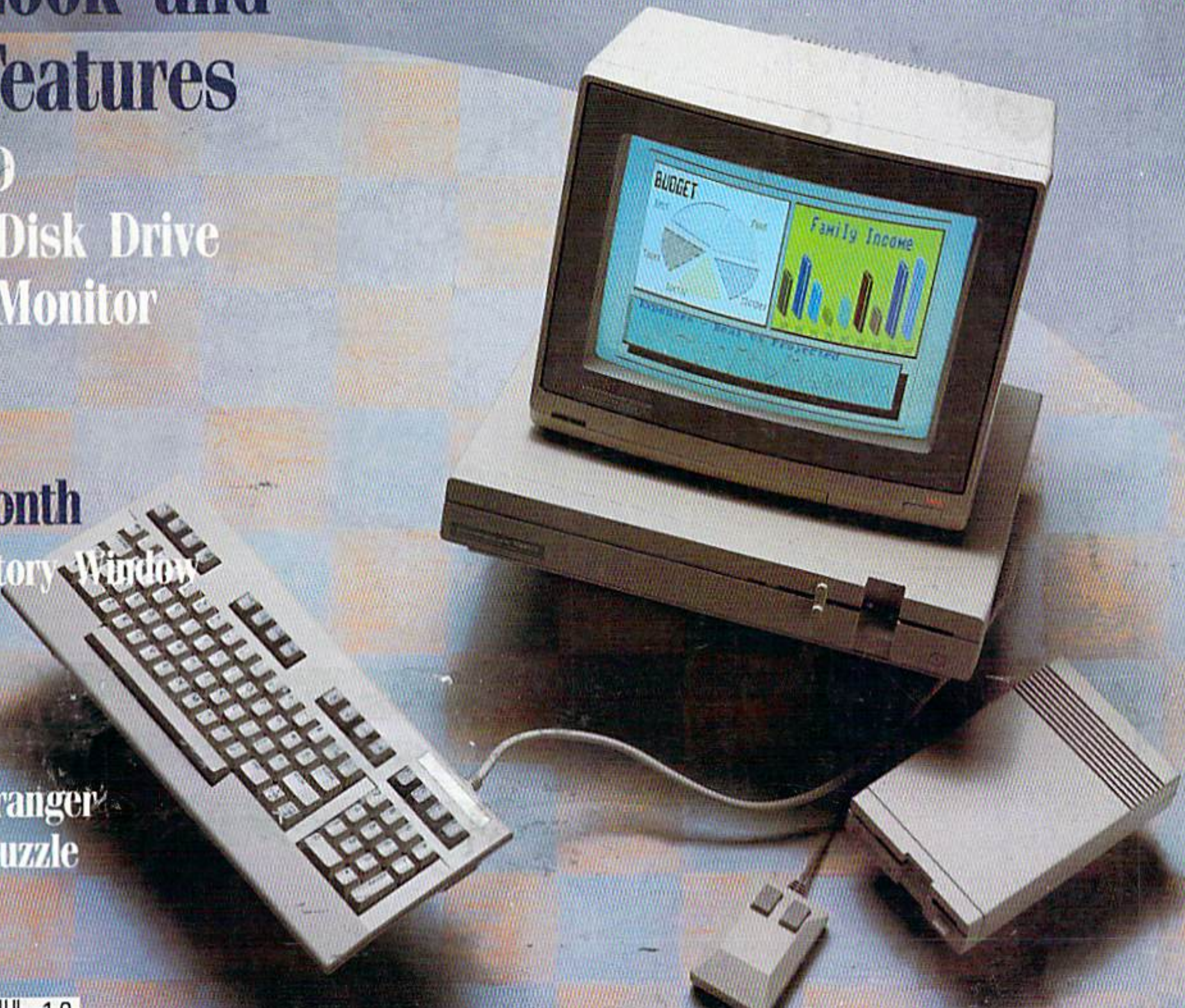

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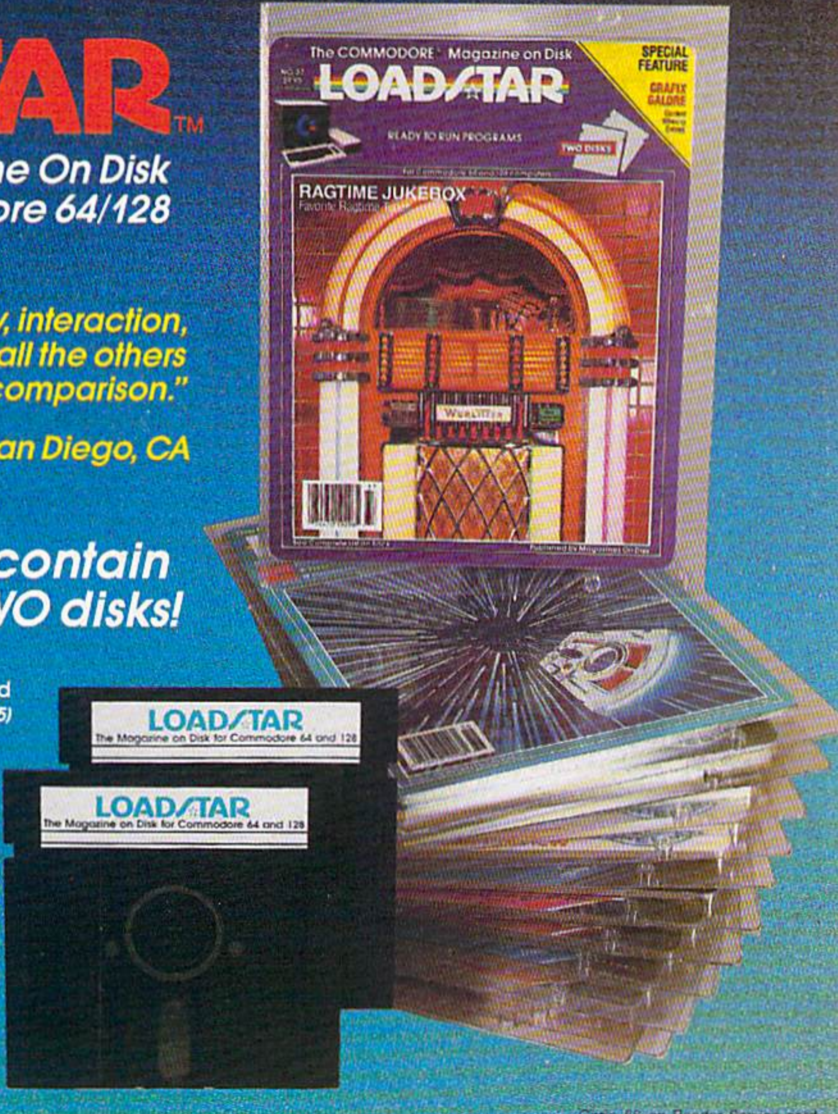
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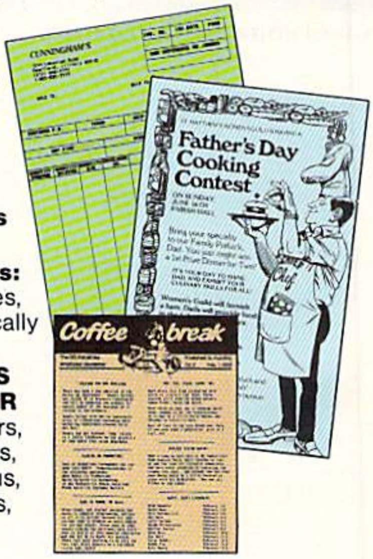

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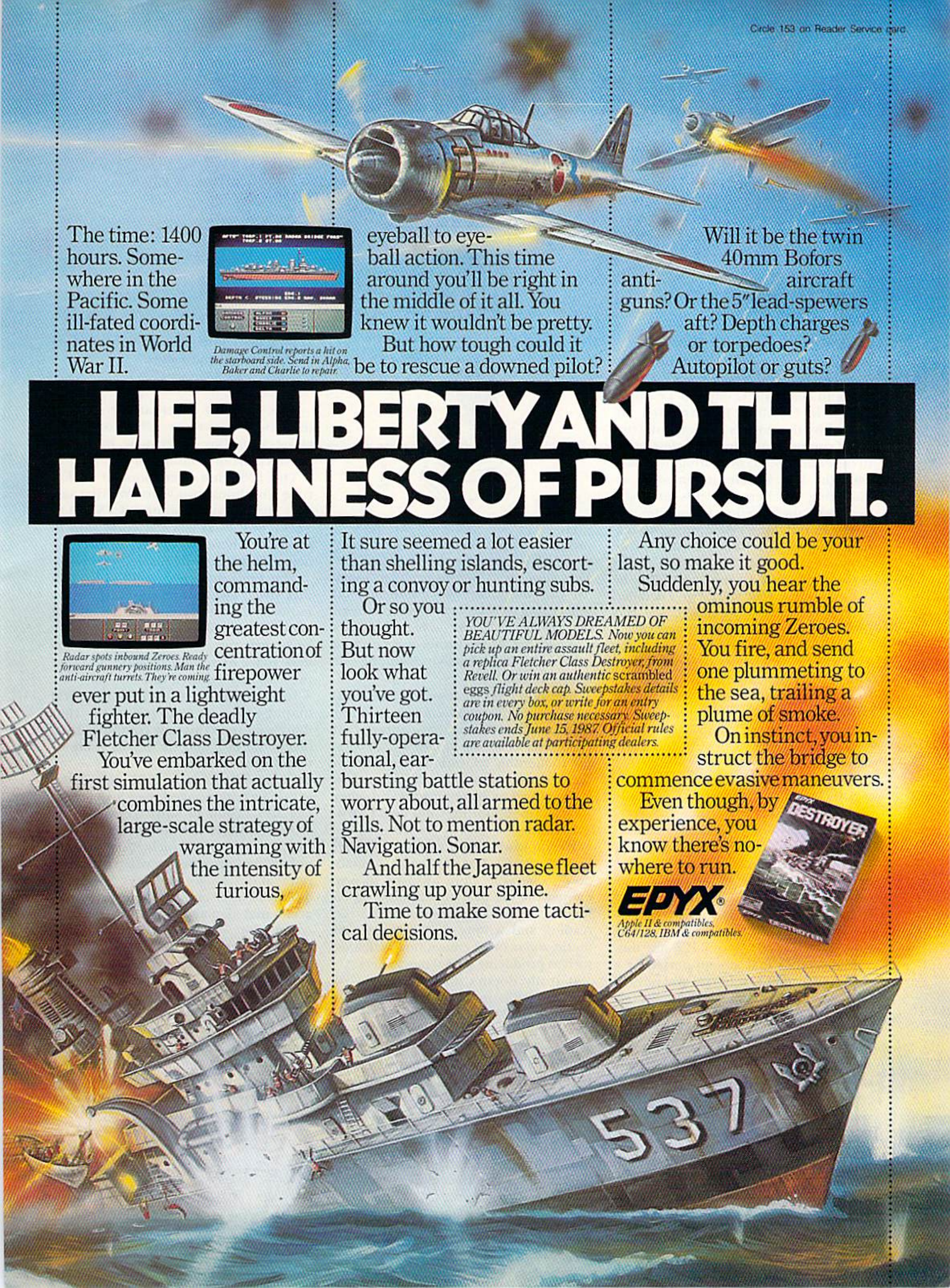

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Or so you thought. But now look what you've got. Thirteen fully-operational, ear-bursting battle stations to worry about, all armed to the gills. Not to mention radar. Navigation. Sonar.

And half the Japanese fleet crawling up your spine.

Time to make some tactical decisions.

Will it be the twin 40mm Bofors anti-aircraft guns? Or the 5″ lead-spewers aft? Depth charges or torpedoes? Autopilot or guts?

Any choice could be your last, so make it good.

Suddenly, you hear the ominous rumble of incoming Zeroes. You fire, and send one plummeting to the sea, trailing a plume of smoke.

On instinct, you instruct the bridge to commence evasive maneuvers.

Even though, by experience, you know there's nowhere to run.

YOU'VE ALWAYS DREAMED OF BEAUTIFUL MODELS. Now you can pick up an entire assault fleet, including a replica Fletcher Class Destroyer, from Revell. Or win an authentic scrambled eggs *flight deck cap. Sweepstakes details are in every box, or write for an entry coupon. No purchase necessary. Sweepstakes ends June 15, 1987. Official rules are available at participating dealers.*

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RUNNING RUMINATIONS

October is Computer Learning Month, but did anyone tell Commodore?

COMPUTER LEARNING MONTH

The educational and computing communities across the country are getting ready to celebrate Computer Learning Month in October. This venture, endorsed by developers and manufacturers of computer products, professionals in the educational computing field, and even the U.S. Senate, is aimed at acquainting teachers, parents and students with the benefits of computer use.

The month-long celebration will feature a series of national contests, free booklets and "back-to-school" nights for parents and a time capsule to be opened in the year 2001. For a detailed look at the events planned, see this month's Resource Center (page 122).

Ken Wasch, who heads the Software Publishers Association, describes Computer Learning Month as "an opportunity for all of us, as parents or educators, to take a close look at how our kids are using computers and to acknowledge the strides in education made possible by teachers who effectively use the technology."

This period of reevaluation would also be an appropriate time for Commodore to assess its educational marketing efforts. In the last few years, Commodore's market share in the educational area has diminished drastically, with Apple, IBM and Tandy garnering the lion's share.

Commodore has a story to tell educators. Their C-64 and C-128 are durable machines that are supported by a wealth of available software and possess impressive sound, color and graphics capabilities. But perhaps the most attractive feature of these machines for price-conscious administrators who make the computer purchasing decisions for their schools is their low cost.

It's ironic that the Commodore machines, which are enthusiastically embraced by the home computer market, are so poorly received in the schools. In the pages of *RUN*, we have touted both the C-64 and the C-128 as the best machines for the educational market, and we still believe that.

However, sometimes it's not the best product, it's the best promotional campaign that captures the marketplace. This appears to be the problem today for Commodore, whose educational marketing efforts have clearly been lacking for well over a year. Is it any wonder that we are witnessing a decline in the educational activities among our readership?

Computer technology for the classroom is an important enough issue for *RUN* to become an active sponsor of Computer Learning Month and to commit to monthly educational coverage in the magazine and online. And we join in the efforts of the organizers and other sponsors in supporting Computer Learning Month.

We applaud this campaign, even with its slight Apple bias, and urge Commodore to become more involved in promoting the use of their machines as effective tools in teaching mathematics, reading and writing skills, science and music, and in other educational activities, such as producing school newsletters.

It really doesn't matter to me what brand name is on the computer my kids learn on at school (although it would be nice if they could augment their efforts at school with our C-64 at home). School children will learn just as much on an IBM or Tandy or Apple as they will on a Commodore.

But, as a parent, I'm concerned when I walk into schools and see classrooms having to share computer systems. I can't help but think that the low cost of Commodores would let more classrooms have their own system.

That's the message that Commodore should be sending into school corridors as the school year begins.

NEW HARDWARE DEBUTS

This month's cover article reviews the new Commodore 128D computer, along with two other new hardware products from Commodore.

The 128D has been popular in Europe for almost two years. We first saw it on display at last winter's CES in Las Vegas, but it has just started to ship in the U.S., where, according to preliminary reports, it is being well received.

The 128D includes a built-in 5¼-inch disk drive and power supply, and the monitor can rest right on top of the computer unit. Even with its detachable keyboard, this machine occupies less desk space than the 128—and it's more professional-looking, too.

In his article (page 38), *RUN* technical manager Louis Wallace notes that there's more to this new computer than meets the eye, and he details some of its internal features.

Commodore's new 1581 disk drive, which was announced over a year ago, has also begun to ship recently. This drive introduces the Commodore owner to the world of 3½-inch disks, a technology that provides increased transfer rates and storage capacity. The rigid disks also offer greater protection from accidental damage. The disk drive is compatible with both the C-64 and C-128 computers.

Those Commodorists who are in the market for a second disk drive or have high-capacity storage needs should consider this new drive.

Commodore is also introducing a new monitor: the 2002, which is designed for use with any Commodore computer. This monitor eliminates the need to purchase a new one if you change to another Commodore computer.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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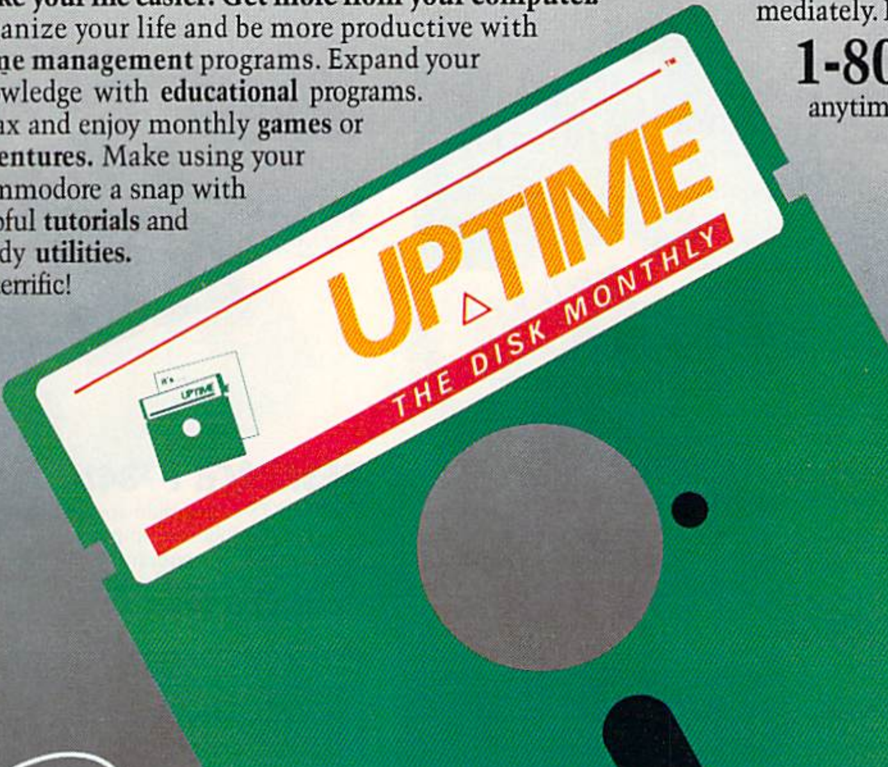

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R-10

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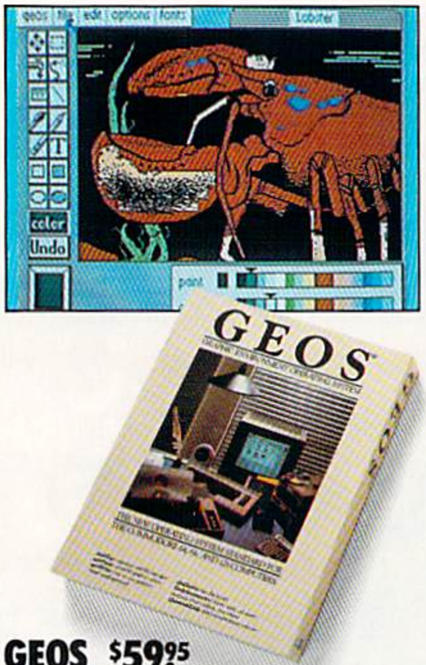
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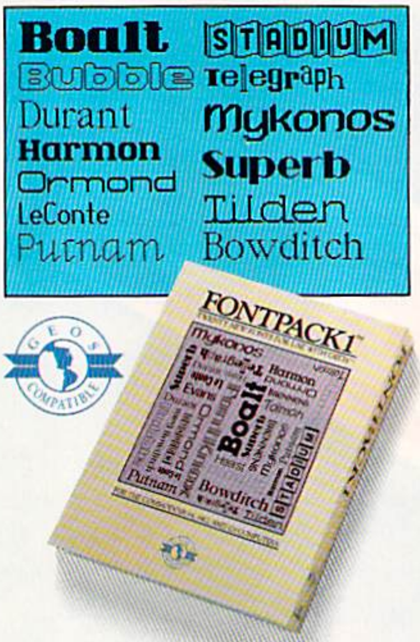
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GEOS COMPATIBLE
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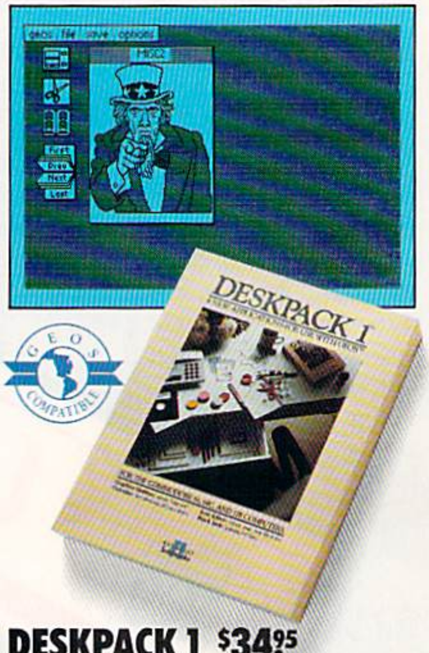
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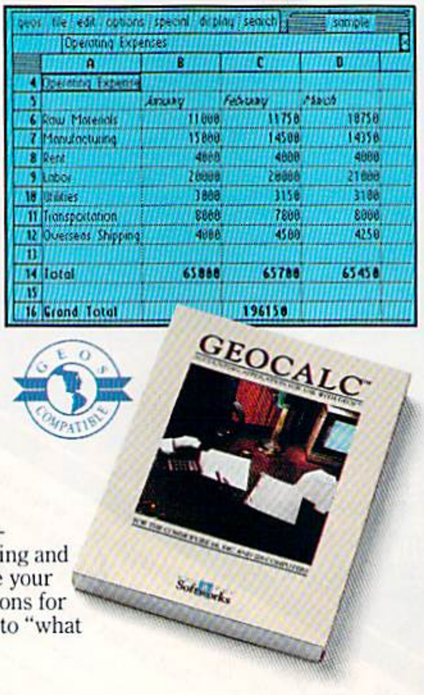
First
Prev
Next
Last
GEOS COMPATIBLE
DESKPACK1

DESKPACK 1 $34⁹⁵

Four GEOS-compatible applications: Graphics Grabber for importing art from Print Shop,™ Newsroom™ and Print Master™ graphics; Calendar; Icon Editor and Black Jack Dealer.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file
edit
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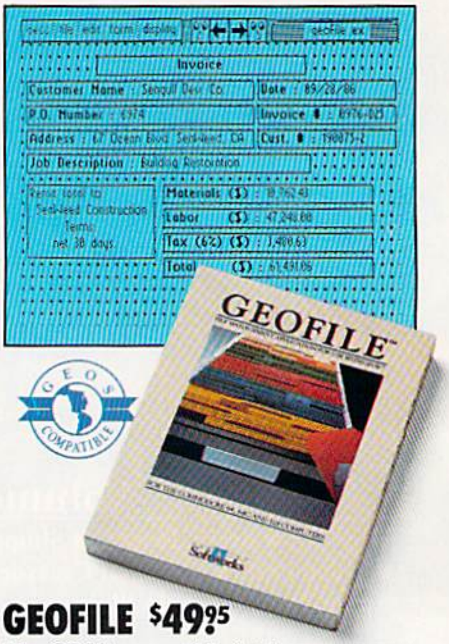
display
search
sample
GEOS COMPATIBLE
GEOCALC
Softworks

Operating Expences

	A	B	C	D
4	Operating Expense			
5		January	February	March
6	Raw Materials	11000	11750	10750
7	Manufacturing	15000	14500	14350
8	Rent	4000	4000	4000
9	Labor	20000	20000	21000
10	Utilities	3000	3150	3100
11	Transportation	8000	7800	8000
12	Overseas Shipping	4000	4500	4250
13				
14	Total	65000	65700	65450
15				
16	Grand Total		196150	

GEOCALC $49⁹⁵

The GEOS-compatible, number-crunching spreadsheet for tracking and analyzing numerical data. Create your own formulas, perform calculations for anything from simple geometry to "what if" cost projections.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Invoice
Customer Name :
Date : 09/28/86
P.O. Number : 6974
Invoice # :
Address :
Cust. # :
Job Description : Building Restoration
Remit total to:
Terms:
net 30 days
Materials ($) :
Labor ($) :
Tax (6%) ($) :
Total ($) :

GEOFILE $49⁹⁵

The GEOS-compatible database manager that sorts, edits and prioritizes whatever data you feed it. You fill out the "input form," specify your command, and geoFile takes it from there.

Circle 134 on Reader Service card.

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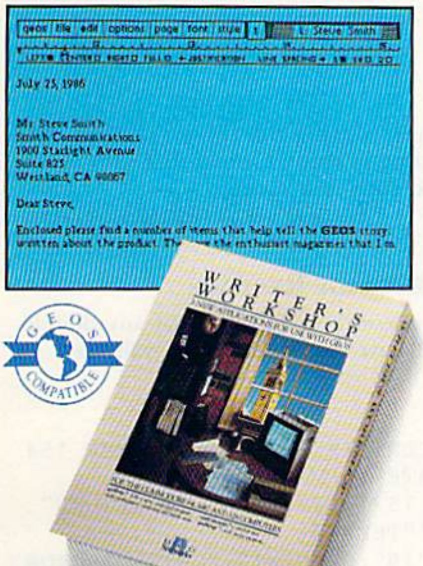


July 25, 1986

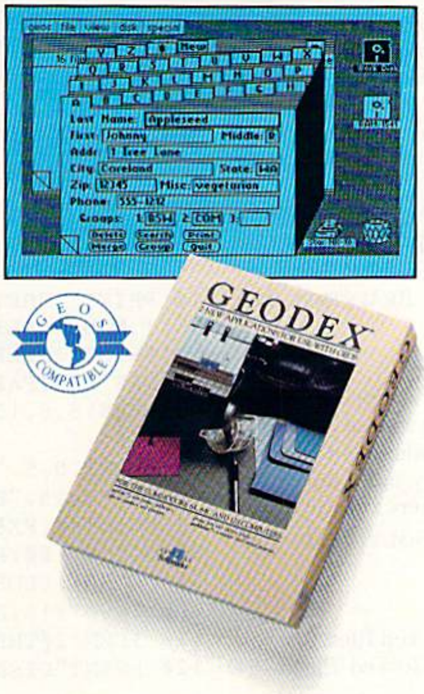
Mr. Steve Smith
Smith Communications
1900 Starlight Avenue
Suite 825
Westland, CA 90067

Dear Steve,

Enclosed please find a number of items that help tell the **GEOS** story written about the product. Th… the enthusiast magazines that I'm

GEODEX $39⁹⁵

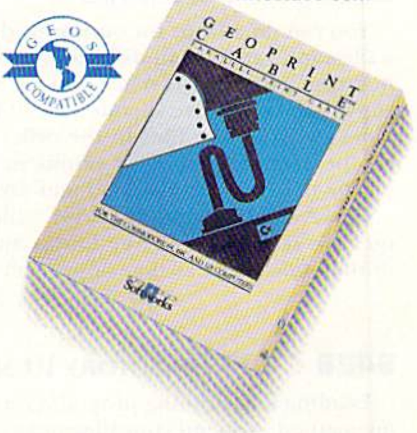
The GEOS-compatible directory that allows you to create lists by name, address, phone number, etc. Includes geoMerge to customize form letters and invitations.



Last Name: Appleseed
First: Johnny
Middle: D
Addr: 1 Tree Lane
City: Coreland
State: WA
Zip: 12345
Misc: vegetarian
Phone: 555-1212
Groups: 1: BSW 2: COM 3:

GEOPRINT CABLE $39⁹⁵

The six-foot cable that speeds up printing because it's parallel—not serial. Connects easily to Commodores with fewer wires and no interface box.



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Sooner or later, you're going to discover that there's more to Commodores than fun and games.

You're going to discover power.

Not the kind of power that blasts aliens out of the galaxy. But the kind that whips through boatloads of data in seconds. The kind that crunches numbers and drafts documents like child's play.

The kind you find in GEOS.

Every GEOS application can take your Commodore from "mastering the universe" to a university master's degree, with all kinds of advanced capabilities that function at hyper-speeds you never imagined possible.

So if you're tired of toying with technology, try playing around with GEOS. Once you feel its power, you'll know that for anyone who still thinks Commodores are toys, the game's over.

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MAGIC

Load and run C-128 programs the easy way; unlock C-128 files; control C-64 Input statements; turn your word processor into an outline processor; and more.

Compiled by JIM BORDEN

$427 FILE-COPYING TIP

You can do a favor for both your disks and drive by using a file-copy, rather than disk-copy, program to copy files to a new disk. Here's why. When you use a disk-copy program to copy files, your drive spends a lot of time searching for free blocks to copy the files in the order in which they appear on the original disk. This results in greater wear and tear on the drive during the load and save process.

However, copying a disk with a file-copy program wastes no time searching for free blocks and reproduces the files in the same order as they appear on the original disk

—ROBERT B. COOK, BRAINTREE, MA

$428 C-128 DIRECTORY RUN

Loading and running programs on your C-128 is easy with my method. Append your filenames with a shifted space and a shifted @ before you save them. Then, when you're ready to load and run a program, list the directory, move the cursor to the filename and press F6. That's all there is to it!

—FRANK KLEIN, SOUTH ELGIN, IL

$429 C-128 AND LOCKED FILES

Unlike the C-64, the C-128 can't load locked files. But you can get around this by first loading the locked file in 64 mode to unlock it, then copying the file to another disk. Now your unlocked copy is ready to load in C-128 mode. You can use the locked copy as a backup.

—L. M. LABAR, BETHLEHEM, PA

$42B 1571 DOUBLE-SIDE RESTORE

Use my program to restore to 1571 format any double-sided disk that you have unintentionally validated in 1541 mode.

```
10 PRINT"{SHFT CLR}FIX 1571 DISK AFTER 154
   1 MODE VALIDATE":REM BILL DEVOS
20 PRINT"INSERT 1571 DISK AND HIT RETURN"
30 GET A$:IFA$=""THEN30
40 OPEN15,8,15,"I0":PRINT#15,"U0>M1":GOSUB
   100
50 OPEN1,8,5,"#":PRINT#15,"U1:5 0 18 0"
60 PRINT#15,"B-P: 5 3":FX$=CHR$(128)
70 PRINT#1,FX$;:PRINT#15,"U2:5 0 18 0"
80 GOSUB 100:PRINT#15,"I0"
90 CLOSE1:CLOSE15:PRINT"DONE":END
100 INPUT#15,EN,EM$,ET,ES
110 IFEN<20THEN RETURN
120 PRINT"DISK ERROR!"
```

►

TRICK OF THE MONTH

$42A C-64 LIMITED INPUT SUBROUTINE

My routine lets you control the kind of data you want to enter into Input statements on the C-64. First, you control the prompt with a Print statement. The variable L is used to limit the length of the input. If L = 5, for example, only five characters may be entered.

The variable T controls the type of character it will accept. If you set T equal to 0, it'll accept any printable character; if it equals 1, it'll accept only numbers; and if it equals 2, it'll accept only letters. The variable S$ holds the string you input. Here are some examples:

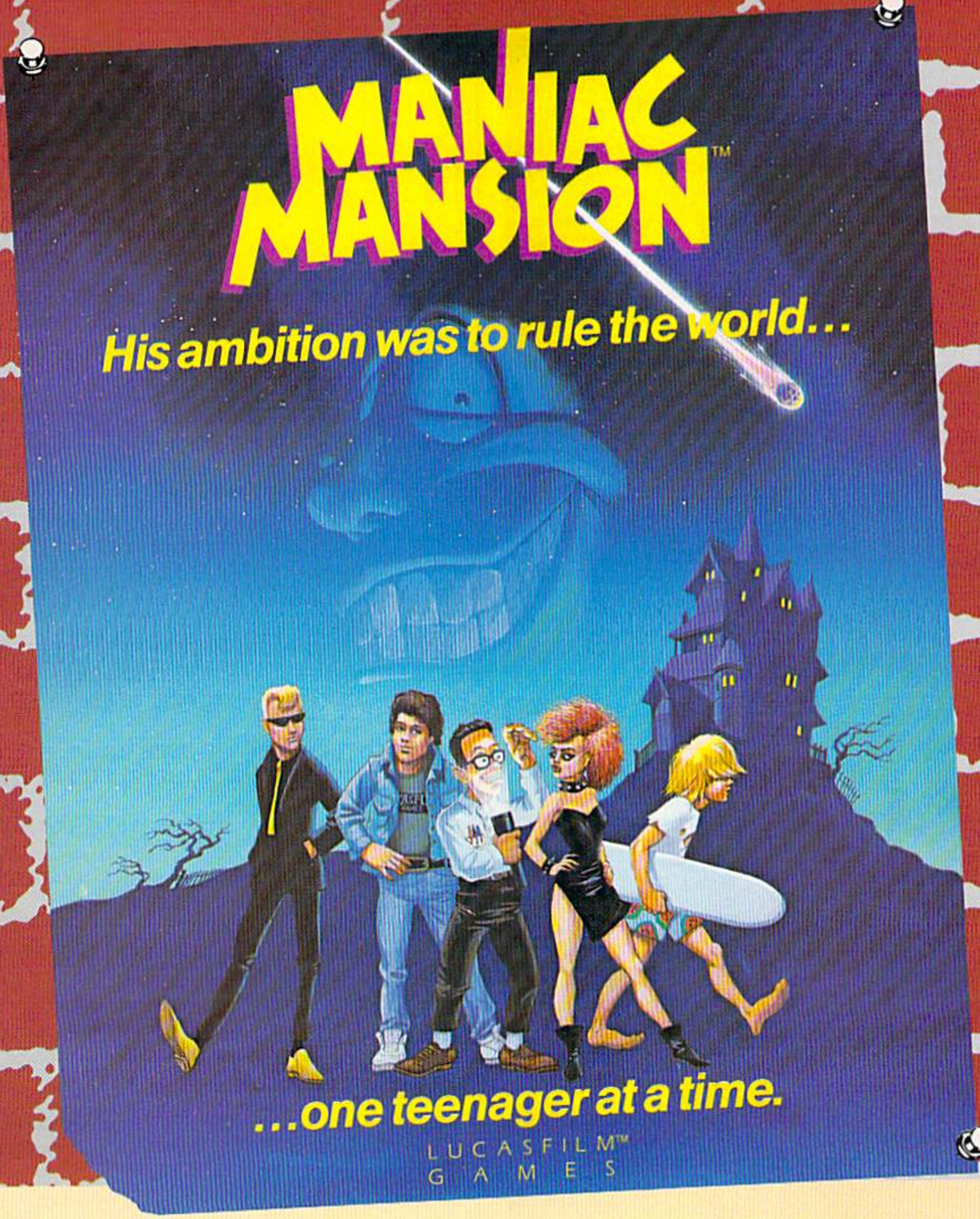
```
PRINT "ANY STRING: ";:T = 0:L = 80:GOSUB10000
PRINT "UP TO 10 CHARACTERS: ";:T = 0:L = 10:GOSUB10000
PRINT "SOME NUMBERS =  ";:T = 1:L = 80:GOSUB10000
PRINT "UP TO 8 LETTERS? ";:T = 2:L = 8:GOSUB10000
```

Experiment with these examples in Direct mode. I'm sure you'll agree that this is a versatile routine.

```
9999 REM ULTIMATE INPUT ROUTINE-GEOFFREY K
     ERCHNER
10000 POKE204,0:Z=0:S$="":PRINT" {CRSR LF}
      ";:POKE198,0:IF L=0THEN L=255
10010 GET A$:IFA$=""THEN 10010
10020 IF L$="" THEN 10050
10030 L=0:FOR J=1TOLEN(L$):IF A$=MID$(L$,J
      ,1)THENL=1
10040 NEXT:ON L+1 GOTO 10010,10100
10050 IF A$=CHR$(13)THEN PRINT" ":POKE204,
      1:POKE 207,0:L=0:T=0:RETURN
10060 IF A$=CHR$(20)ANDZ<>0THENZ=Z-1:S$=LE
      FT$(S$,Z):PRINT" {2 CRSR LFs} {CRSR
      LF}";:GOTO10010
10070 A=ASC(A$):IFA<32OR(A<160 AND A>127)
      OR L=Z THEN10010
10080 IF T=1 AND (A<48 OR A>57) THEN 10010

10090 IF T=2 AND (A<65 OR A>90) AND A<>32
      THEN 10010
10100 PRINTA$;:POKE212,0:PRINT" {CRSR LF}"
      ;:Z=Z+1:S$=S$+A$:IFL$=""THEN10010
10110 PRINT" ":POKE204,1:POKE207,0:L$="":L
      =0:RETURN
```

—GEOFFREY KERCHNER, OAK RIDGE, TN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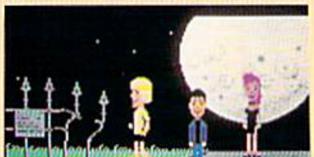
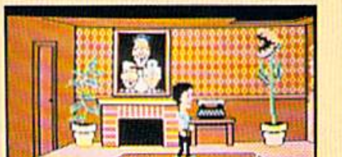
But wait! There's more! *Dave needs your help to rescue her. You pick two of Dave's friends to help him. Then you direct all three characters around the mansion, and gather the objects they'll need to save poor Sandy—not to mention themselves.*

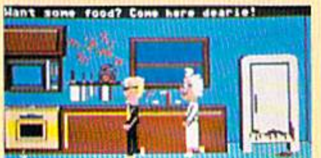
And that's not all! *How it all ends up depends on who you choose to help Dave and how you get them through the story. In* Maniac Mansion, *you get all this, plus super graphics, great animation, and more fun than you can shake a joystick at!*


Push Open Walk to New Kid Turn on
Pull Close Pick up Unlock Turn off
Give Read What is Use Fix

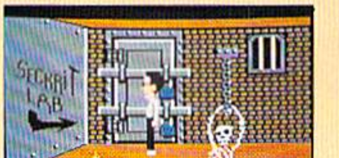
The fate of the world rests upon these shoulders.


Push Open Walk to New Kid Turn on
Pull Close Pick up Unlock Turn off
Give Read What is Use Fix
glass jar flashlight
chainsaw

Botany 101 never prepared you for *this!*


Want some food? Come here dearie!
Push Open Walk to New Kid Turn on
Pull Close Pick up Unlock Turn off
Give Read What is Use Fix
key

Meet interesting people…and run from them.


SECKRIT LAB
Walk to
Push Open Walk to New Kid Turn on
Pull Close Pick up Unlock Turn off
Give Read What is Use Fix

Could this be a clue? You decide.

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If you can't find Maniac Mansion at your local retailer, call 1-800-227-6900 to order by mail.

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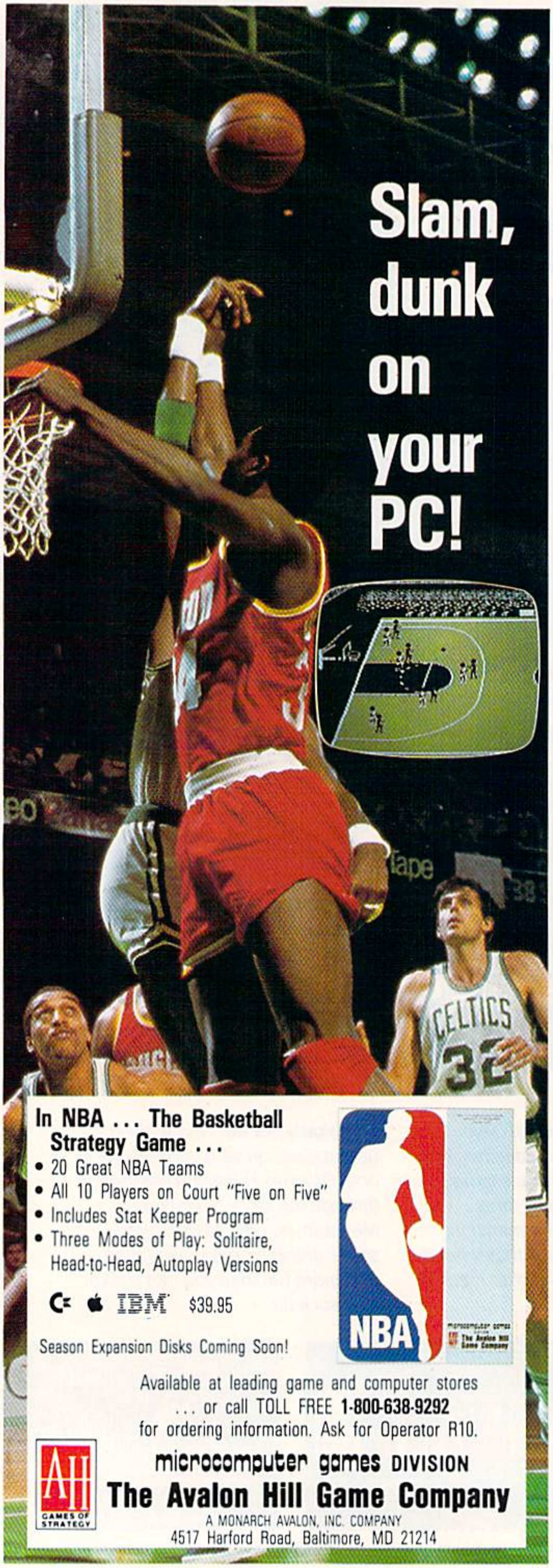
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```
130 PRINT EN;EM$;ET;ES
140 CLOSE1:CLOSE15:END
```

—Bill De Vos, Clifton, NJ

$42C C-128 Address Label Saver

The standard 3½-inch address labels are too big for the return address on small envelopes, so I wrote a program that prints the address twice in Condensed mode on the same label, to cut in half the size and number of labels you use.

You can input up to five lines per label. If you need just three lines, press return over the first and last lines. If your name or address is very long, change the value of the SPC(30) in line 120. A smaller number will print the two labels closer together.

```
10 REM MINI LABELS- MARY E. WILSON
20 PRINT CHR$(14):OPEN4,4,7:ES$=CHR$(27)
30 PRINT#4,ES$+"{SHFT B}"+CHR$(3);:REM COM
   PRESSED
40 PRINT#4,ES$+"0";:REM 1/8" SPACING
50 PRINT"{SHFT CLR}{2 CRSR DNs} IF COMMAS
   ARE DESIRED, ENCLOSE LINE IN QUOTES{2 C
   RSR DNs}"
60 INPUT"HOW MANY LABELS";N
70 FORZ=1TO5:PRINT"LINE"Z;:INPUTA$(Z):NEXT

80 PRINT"{2 CRSR DNs}IS THIS CORRECT? (Y/N
   )"
90 GET AN$:IFAN$<>"Y"ANDAN$<>"N"THEN90
100 IF AN$="N"THEN RUN
110 FOR I=1 TO N:PRINT#4
120 FORZ=1TO5:PRINT#4,A$(Z)SPC(30-LEN(A$(Z
    )))A$(Z):NEXT Z
130 PRINT#4:PRINT#4:NEXT:CLOSE4
```

—Mary E. Wilson, Clearwater, FL

$42D Screen Edit Trick

Here's a quick and simple way to move part of one line to merge with another line in a listing. Let's combine lines 10 and 40, below.

```
10 A=6:B=1:A$="XYZ"
20 IF A$="" THEN 100
30 X=Q*5+120
40 C$="TO"
```

First, add a colon before the C$ in line 40, move the cursor back to the colon and use the insert-delete key to put in enough spaces to move the colon just past the text you want to insert. Hit the return key. You should now have a display like this:

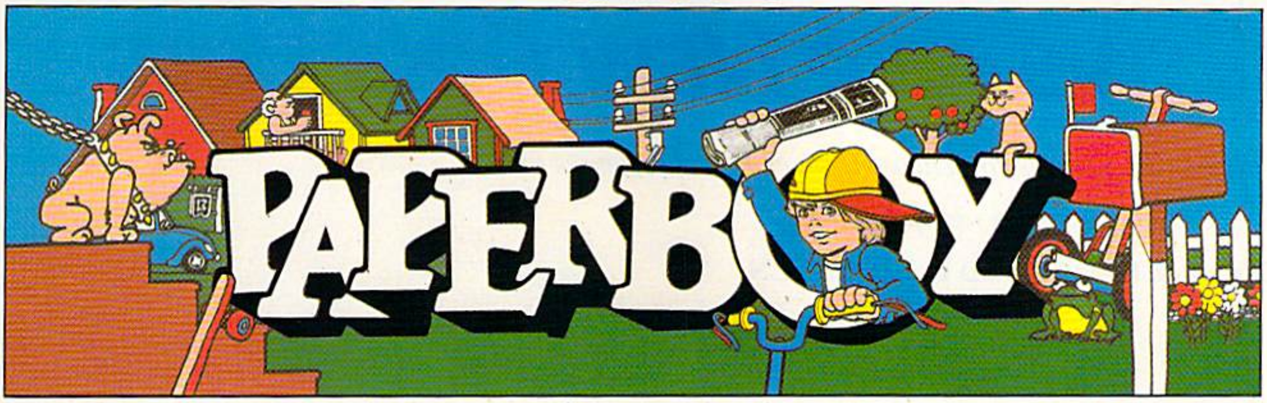
```
10 A=6:B=1:A$="XYZ"
20 IF A$="" THEN 100
30 X=Q*5+120
40                    :C$="TO"
```

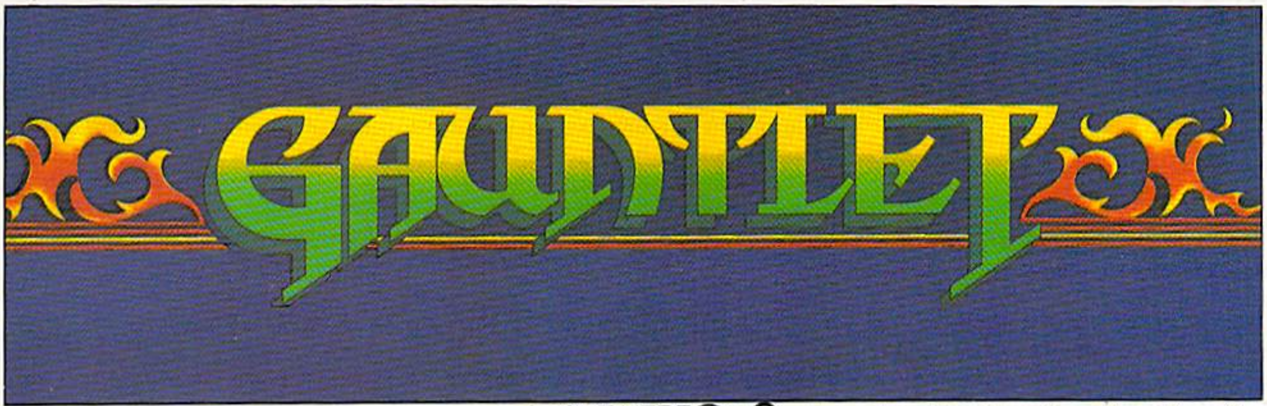
Now move the cursor to line 20 and list line 10. This will place line 10 in the blank spaces without erasing the original line 40 text. The screen should look like this:

```
10 A=6:B=1:A$="XYZ"
LIST10
```

Continued on p. 126.

CUT HERE





CUT HERE

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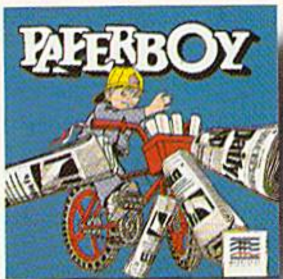

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NEWS AND NEW PRODUCTS

This month, gamers can choose from eight new releases and GEOS users can get a new joystick.

Compiled by HAROLD R. BJORNSEN

GET A HANDLE ON YOUR C-128

MORENO VALLEY, CA—Handle 128's menus provide you with one-keystroke access to your computer's utilities.

The Terminal Setup menu lets you display and set the time, choose the console color scheme and select some terminal parameters.

With the Sequential File Utility menu, you can scratch, rename, copy and append sequential files.

The Sequential File Transfer menu lets you select input and output devices for creating or transferring files. You can copy tape to disk, keyboard to printer and tape to printer.

Handle 128 is available for $19.95 from Solomon Software Systems, Inc., 24285 Sunnymead Blvd., #256, Moreno Valley, CA 92388.

Check Reader Service number 401.

STUFF IT!

ALBANY, OR—Supra Corp. (1133 Commercial Way, Albany, OR 97321) has released the MicroStuffer Printer Buffer for the Commodore computers and most parallel printers, including Epson, Star Micronics, Okidata and Panasonic. Its 64K buffer stores the data from your computer's memory so that you can use your computer for other work while the printer is active. You plug your printer cable into the MicroStuffer's 36-pin Centronics parallel port and plug the output cable (included with the buffer) into your printer. It works with both text and graphics data and is transparent to applications software. MicroStuffer is available for $69.95.

Check Reader Service number 402.

MicroStuffer

Supra's MicroStuffer printer buffer works with any Commodore computer and most parallel printers.

PUN WITH NORD AND BERT

CAMBRIDGE—Nord and Bert Couldn't Make Head or Tail of It, a collection of eight short stories for the C-128, each of which involves a different kind of wordplay, takes you to a place where nothing is quite as it seems. It's a place where you can make a mountain out of a molehill, where the "fur is flying" is taken literally, where a bow can be turned into a beau and where you'll have to shake a tower before you can take a shower. You can fry it bum Infocom (125 CambridgePark Drive, Cambridge, MA 02140) for $34.95.

Check Reader Service number 406.

MICROPROSE TO CHANGE ITS NAME

BALTIMORE—MicroProse Software, a designer and marketer of entertainment software for the Commodore computers, will implement a change in the company and brand names within a year, according to an agreement with MicroPro International Corp. signed last June.

MicroPro filed suit against MicroProse in 1986 for alleged infringement of the "MicroPro" trademark. Under terms of the settlement, MicroProse has agreed to modify or change its corporate name, trade name, service mark and trademark, while MicroPro has agreed not to use any designation containing the word "prose" for at least ten years. MicroProse must initiate the name change within one year and complete the change within four years.

MicroProse Software President, Bill Stealy, said, "Our positioning in the marketplace has changed. We've established a European subsidiary, entered new segments of the entertainment marketplace and have future plans for even more diversification. We'll look at this as an opportunity to provide a name more in keeping with our recent changes and future plans."

FIVE 64 GAMES

CHATSWORTH, CA—Datasoft (19808 Nordhoff Place, Chatsworth, CA 91311) has released five new games for the C-64.

In Tomahawk, a helicopter simulation, you select combat or training missions at four pilot-training levels in a 3-D real-world display. It features offensive and defensive flight maneuvers, ground attack and air-to-air interception, day- and night-vision systems and instruments-only flying. $34.95.

As the commander of a special forces unit sent to the planet Karis in Force 7, your mission is to rescue crew members one at a time from an energy fabrication plant that's been overrun by aliens. $19.95.

Bismarck—The North Sea Chase, a war strategy battleship simulation, lets you choose to command either the Royal Navy or the Bismarck itself. $34.95.

Tobruk—The Clash of Armour tank simulation, war strategy game puts you in the role of Rommel, head of the German Afrika Korps, in an attempt to defeat the British in North Africa to destroy their hold on the southern Mediterranean. $34.95.

Dark Lord is a graphics/text adventure in which you've inherited your grandfather's house and all his possessions, including a journal that reveals a discovery he's made. $19.95.

Check Reader Service number 403.

CONTROL YOUR ARTWORK

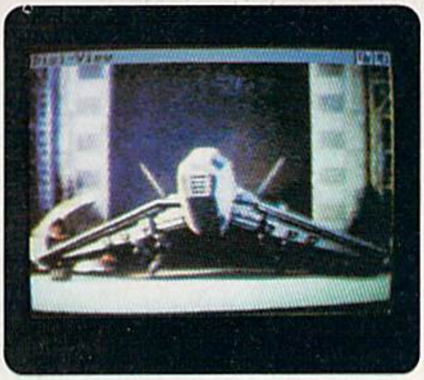
RAMSEY, NJ—The Advanced OCP Art Studio, a graphics program for the C-64, can be controlled by keyboard, joystick, Datex mouse and KoalaPad. It operates in hi-res mode and lets you modify colors. The program includes 16 pens and 16 user-definable brushes coupled with three levels of magnification, with pan and zoom, pixel clear and plot functions. In addition, the windows can be inverted, cut and pasted, enlarged, reduced, squashed, stretched, flipped and rotated. Textual capabilities include a font editor and nine character sizes. Creations can be saved, loaded and merged from disk, and all popular printer drivers are supported.

The studio comes with a user guide, advanced user guide and two program disks. It retails for $39.95 and is available from Firebird, PO Box 49, Ramsey, NJ 07446.

Check Reader Service number 407.

MEAN MACHINE

WOODS CROSS, UT—Access Software (#A2561 South 1560 West, Woods Cross, UT 84087) has released Echelon, a 3-D space-flight simulator for the C-64. Echelon is a top-secret military facility where you'll be trained to operate the 21st Century's combat and exploration vehicle, the Lockheed C-104 Tomahawk. After mastering its instrumentation and weaponry, you'll be assigned to a newly established patrol zone, where you must find the solution to a series of mysterious and puzzling events. Included in the package is the Lip Stik, a voice-activated headset you'll wear to operate various controls aboard the spacecraft. Available for $44.95.



You'll be piloting this baby, the C-104 Tomahawk, in Access Software's 3-D space-flight simulator, Echelon.

Check Reader Service number 411.

IMPROVE YOUR OPENING MOVES

SAN FRANCISCO—The Guide to Chess Openings, a chess-opening tutorial from Enlightenment (1240 Sanchez St., San Francisco, CA 94114) gives explanations of gameplay during a game, what your opponent's reasonable moves are, whether they are good or bad and why. In addition, the Coffeehouse Chess Monster, a U.S. Championship class chess opponent program, is included, which lets you play out the positions beyond the opening, start new games from scratch, save a library of your games and print out the moves. It's available for the C-64 for $59.95.

Check Reader Service number 413.

BACK TO SCHOOL

PLEASANTVILLE, NY—Six new Bank Street School Filer databases—Animal Life, Astronomy, Endangered Species, North America, Space and United States—have been released for the C-64 by Sunburst (Pleasantville, NY 10570).

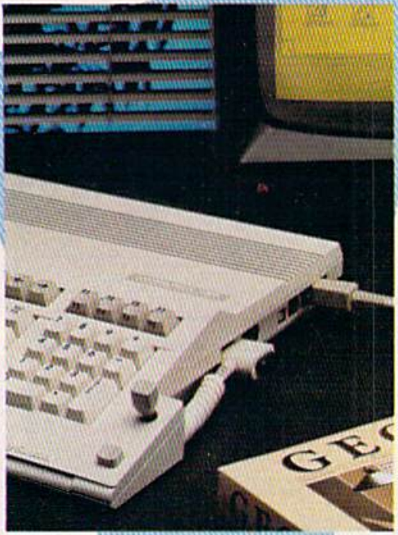
For students in grades 3–12, the databases are reproducible so that teachers and students can add to or update the information. Teacher's guides provide classroom lessons and suggestions for class discussion, and student activity sheets are included in the package. Each section of the guide references all sources of information that appear in the database files.

The databases contain glossaries of new vocabulary and a bibliography of related fiction and non-fiction readings. The packages are available for $59 each.

Check Reader Service number 410.

GEOS JOYSTICK

WHEELING, IL—IconTroller, a keyboard-mounted joystick, is now available for the C-64 and C-128 from Suncom (260 Holbrook Drive, Wheeling, IL 60090). The unit, designed specifically for Berkeley Softworks' GEOS software environment, mounts directly onto the keyboard via semi-permanent, double-faced tape included in the package. You can also connect a gaming joystick or mouse to a "feed-through" jack on the unit while IconTroller is in use. It costs $19.99.



GEOS users now have a joystick specifically made for use with their operating system: Suncom's IconTroller.

Check Reader Service number 405.

MINIATURE GOLF

CUPERTINO, CA—Mini-Putt, a miniature golf game for the C-64, features cartoon-style animation and wacky golf courses and holes. You select the number of people in the party (1–4) and the course you want to play.

Each course represents a theme, such as famous movies, countries, sports and classic video and arcade sequences, and each hole in a course depicts characteristics of the theme in animated detail. The main play screen includes a golfer window, where you select the force and angle of your shot; an overview window, which lets you see obstacles and the other players' current positions; and a play-screen window, which shows each hole and the obstacles and objects in them. You can get it from Accolade (20813 Stevens Creek Blvd., Cupertino, CA 95014) for $29.95.

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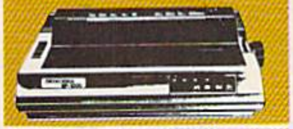

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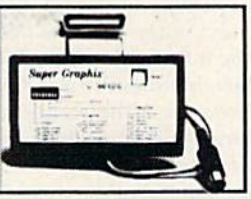

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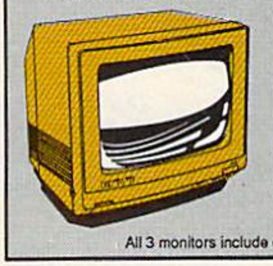

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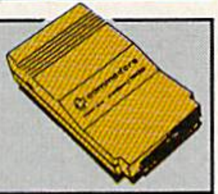

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MAIL RUN

This month in Mail RUN, our readers write about word processors, Dvorak keyboards, CP/M and more.

WHAT'S WRITE FOR *RUN* READERS

Bob Guerra's reviews of word processing software in "What's Write for You" last August were interesting. However, I feel Vizawrite should have been included. I own a number of word processors and consider Vizawrite the most satisfactory of them all. It's the one I use on a regular basis.

Vizawrite has many features I find either lacking or cumbersome in other programs. For instance, a two-key command hides all the on-screen control and format symbols to display the fastest preview of what will be printed of any software I've tried. Also, the tabs and margins are easier to set and change than with some other software, and it can total figures in rows and columns.

I'm aware that constantly using a program tends to create a preference for it, but I still feel Vizastar is a smooth-working program that shouldn't go unmentioned.

—DAVID W. STAIR
REEDS SPRING, MO

"What's Write for You" wasn't meant as a comprehensive article, but rather a survey of some new programs and upgrades to existing programs. We're glad to include your letter in Mail RUN to alert readers to an alternative that's been around for a while and is still going strong.

—EDITORS

The negative treatment of Trio 128 in August's "What's Write for You" article troubled me. As a regular user of Trio, I consider it a good program that has more than enough power and pizzazz to suit the regular needs of most home computer users. It's fast and easy to use, and the manual is excellent.

—JOHN D. OTTINI
ST. PETERSBURG, FL

I feel Bob Guerra was unfair to Fontmaster 128 in his August article on word processors. First, he says the program has no word-wrap feature, but that's not true. All you have to do to get word-wrap is press escape/WW. He also complains that the command area at the top of the screen contains too much material for simple text entry. Well, he doesn't have to use the information if he doesn't want to; in fact, he doesn't even have to look at it. However, if he should ever need the information, it's right there, without having to thumb through a manual.

He is right about the need for a spelling checker, but Xetec is working on one. When they come out with that, in my opinion there'll be no better word processor than Fontmaster 128.

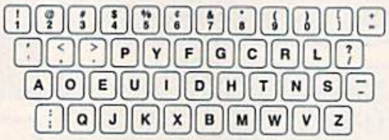
—LEO L. DUSH
NORFOLK, VA

DVORAK KEYBOARDS

I switched from the usual Qwerty keyboard to a Dvorak keyboard a year ago, and I love it. However, now it's difficult for me to use commercial programs that take control of the keys and throw me back into Qwerty. I wish program manufacturers would include a Dvorak option in their products.

I'd be interested in hearing about other readers' experiences with Dvorak—why they switched, what problems they've encountered and whether they're glad they made the change.

—CAROLYN J. BUTLER
PENSACOLA, FL



Dvorak keyboards, in which the keys are arranged according to frequency of use (see above), certainly don't get much publicity. It's said that the only reason for the Qwerty arrangement is that back when typewriters were new, the manufacturers wanted to keep typists from going faster than the mechanical linkages in their machines could work. Of course, these days that reason no longer holds, but the tradition is strong.

We'd like to hear how other RUN *readers and software developers feel about the Dvorak keyboard. We'll publish selected letters in Mail RUN.*

—EDITORS

DFRESTRUCTURE FIX FOR DATAFILE 3.6 FILES

RUN's Datafile series has been great. However, I've discovered that DFRestructure (November 1985) doesn't work correctly with files created by Datafile 3.6 (February 1987). The following changes to DFRestructure will correct this problem.

First, in line 4814, insert K%(I) = I: directly after FORI = 1TOX. Then, place a REM: at the beginning of lines 4818, 4820, 4822, 4874 and 4876. Finally, change !OLD in lines 4840, 4844 and 4848 to .BAK.

—PAUL H. TURNER
READING, MA

This fix works fine. Readers who have Datafile 3.6 and don't have DFRestructure can use DFClone (in the August 1987 issue of RUN*) to reorganize their files.*

—EDITORS

MUSIC WITH MIDI UPDATE

Some points in my "Making Music with MIDI" article in last July's issue of *RUN* need to be clarified. First, one sentence in the software section of the article could be interpreted as meaning sound patches can be stored on ROM cartridges. Of course, this can't be done, because ROMs are, by definition, nonprogrammable. Some synthesizers support programmable cartridges that can be accessed either from the synthesizer's control panel or, under software control, from a computer. MIDI software library programs make it possible to store sound patches on disks instead of ►

CINEMAWARE

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Award For Special Artistic Achievement In A Computer Game.
—*Computer Gaming World, 1987*

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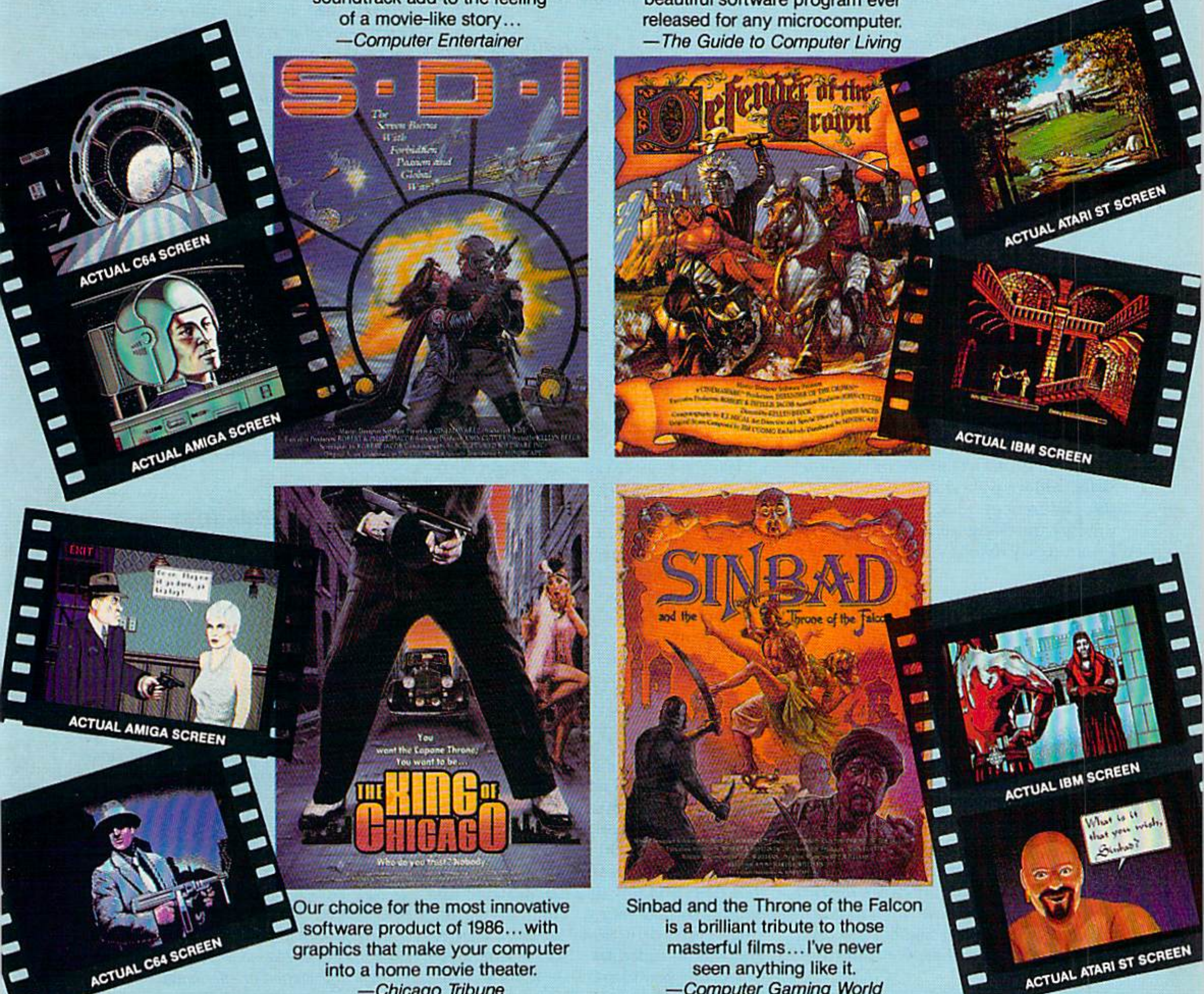
—*Computer Entertainer*

Defender (of the Crown) is the most detailed, most graphically brilliant, most beautiful software program ever released for any microcomputer.
—*The Guide to Computer Living*


ACTUAL C64 SCREEN
ACTUAL AMIGA SCREEN
S·D·I
The Screen Burns With Forbidden Passion and Global War!
Defender of the Crown
ACTUAL ATARI ST SCREEN
ACTUAL IBM SCREEN
EXIT
ACTUAL AMIGA SCREEN
ACTUAL C64 SCREEN
You want the Capone Throne; You want to be...
THE KING OF CHICAGO
Who do you trust? Nobody.
SINBAD and the Throne of the Falcon
ACTUAL IBM SCREEN
What is it that you wish, Sinbad?
ACTUAL ATARI ST SCREEN

Our choice for the most innovative software product of 1986...with graphics that make your computer into a home movie theater.
—*Chicago Tribune*

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—*Computer Gaming World*

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Circle 28 on Reader Service card.

on relatively expensive cartridges. For roughly the price of one cartridge that will store a few dozen patches for a specific synthesizer, you can store several hundred patches on a disk, using software that may work on several different synthesizers.

Second, I indicated that editing sound patches from the control panel of a synthesizer is a user-unfriendly process. A MIDI patch-editing program (which should include the functions of a software librarian) can make this task much easier by organizing and displaying the patch parameters in a logical and accessible way. A good understanding of your synthesizer's capabilities is helpful, but no special programming skills are required when *using* patch-editing software. However, *writing* patch-editing software does require skills that are beyond the capabilities of the casual Basic programmer.

—DAVID BROOKS
YORKTOWN, VA

CHILDREN AND COMPUTER CARE

We have four children, ranging in age from 7 to 13. All of them are getting quite familiar with our computer, and we're trying to teach them proper care of the equipment. I made an enlarged copy of the list of do's and don'ts in Annette Hinshaw's article in last June's issue, and we posted it as a reminder to the children of what we expect when they use the computer. It's working, and I want to say thanks.

—KURT REINKE
WHEATON, IL

INPUT FROM BRITAIN

I'm an avid reader of *RUN* in Britain. It's a good, comprehensive publication on Commodore computing, and the listings are useful and well written.

Recently, I purchased GEOS, Writer's Workshop and PrintMaster from Berkeley Softworks, and I want to congratulate their programmers for jobs well done. The clock in GEOS runs fast over here, but a short Basic program from the British GEOS supplier, First Analytical Ltd., of London, puts that right. They're an excellent company that gives full GEOS support.

I envy the choice of disk games for the C-64, especially strategic and war games, that you have in the States, but I'm shocked at your prices. They're much higher than in Britain. I wish I could get Art Gallery 1 and 2, but I haven't been able to find a supplier yet.

I belong to ICPUG, the British Commodore user's club. The club is always helpful with advice, and it offers programs from a large disk library to members for the price of postage. It also provides discounts on both software and hardware.

—DAVID PEACOCK
FLEETWOOD, LANCASHIRE,
ENGLAND

We enjoy hearing from RUN *readers overseas. If more of you would write to Mail RUN, we could add a more international flavor to the column.*

—EDITORS

SOME OF US USE CP/M!

I'm writing to recommend a general ledger program, written in CP/M, that I've been using on my C-128. It's called Business Manager-General Ledger, and it's put out by DataComp.

I owned three general ledger programs for the C-64, but none of them performed the way I'd been promised they would. Then, I saw an ad in *RUN* for Business Manager-General Ledger, and it looked interesting. I called DataComp, and, because of a low introductory price, I ordered the program. After thoroughly reading the manual, I took a big leap and bought a C-128, plus two 1571 disk drives and a Magnavox RGB monitor.

I'm extremely pleased with Business Manager-General Ledger. It more than meets my requirements for seven characters per account number and 500 general ledger accounts. It's handling 650 accounts for me now, and I may increase that number to 800 or more next year. Also, the program isn't copy-protected, and there's plenty of help available for getting started with it. The package includes an instructional audio cassette, and when I called DataComp with questions, the president, I. J. Blevens, was very helpful.

The present price of Business Manager-General Ledger is $150, but I feel it's worth much more. I'd be glad to tell anyone who's interested more about my experience with this program, and you can get information from the company by writing to DataComp, PO Box 1918, Grants Pass, OR 97527.

As for me, now I'd like a word processor and database program in CP/M.

—ROBERT B. LAUDER
40 GRASSHOPPER LANE
FAIRFIELD, PA 17320

WordStar, of course, is a standard for word processors in the industry, not just in the world of CP/M. Some people love it, and others hate it.

We'd like to hear about CP/M programs—word processors, databases or whatever—that other C-128 users enjoy. If you use CP/M, send your comments along to Mail RUN, so we can spread the word.

—EDITORS

I traded in my C-64 for a C-128, mainly because of CP/M. However, I could never figure out how to use that mode—at least until I read "A Beginner's Tour of CP/M," by Annette Hinshaw, in last August's *RUN*. I still don't understand a lot about it, but I've made a good start by printing out all the help files. I couldn't even get that far before. What Ms. Hinshaw has written is an understandable demo course in CP/M.

—JAMES P. HALL
ST. PETERSBURG BEACH, FL

TECHNICAL SUPPORT

I contacted the *RUN* technical department recently, because I couldn't get the Needlegraph program I'd typed in from the July 1986 issue to run. The editor I spoke to had me send my disk in. It was returned promptly with my mistakes corrected, and I was able to get right to work on my needlepoint project.

A while ago, I'd lost interest in typing in program listings, because it was too hard to get them right. Encouraged by *RUN*'s technical support, I'm busy at the keyboard again.

—BETH ANN JONES
MILTON, VT

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances, provide information or offer hands-on advice. Send your letters to Mail RUN, 80 Elm St., Peterborough, NH 03458. Each letter must include the writer's name and complete address. RUN *reserves the right to edit letters for style, clarity and space.* ■

The Mission is Vital. The Odds are Against You.

You're one of the elite . . . parachuting alone behind enemy lines. The enemy controls the terrain, hidden in bunkers and machine gun nests . . . you may be surrounded. You might complete the mission if you crawl through the ravine and approach from the rear . . . or maybe a frontal attack will take them by surprise.

MicroProse has broken new ground with **AIRBORNE RANGER**, the quality action game where tactical thinking and lightning reflexes determine your fate. Your missions will vary as much as the climate and terrain. Slip silently into position to rescue prisoners trapped in "tiger pits" from a P.O.W. camp, or throw caution to the wind and try to destroy a key munitions dump in the desert. But watch out . . . enemy troops can attack from any direction.

The action is fierce as you control one soldier's battle against overwhelming odds. You'll need skill and strategy to outmaneuver your enemy, plus courage and some luck to make your escape. Along the way, search out that hidden cache of weapons and first aid supplies . . . you'll probably need them.

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SOFTWARE GALLERY

Step right up, Ladies and Gents! This month for your reading pleasure we have sports, we have travel, we have accounting, and we have adventure!

Compiled by BETH S. JALA

SKY RUNNER .... B+

A Futuristic Mission Impossible: Will You Tackle It?

Sometimes even a tough 24th century mercenary like yourself latches on to an assignment where pay, no matter how generous, is not the main attraction. Certainly, this business with Sky is such an occasion. Harvested on the planet Moloc, Sky is a highly addictive drug employed by a planetary dictatorship to maintain absolute control of its population. As a hireling of the desparate Freedom Underground, your job is to "run" the plantation defenses and destroy production facilities, thus earning a juicy bonus plus the undying gratitude of liberty-loving peoples across the inhabited galaxy. Quite a paycheck—if you live to collect!

Spinnaker's Sky Runner is a fast-paced combat arcade game, featuring flight-simulation and ground-chase action in three-dimensional, smoothly animated color. You begin a mission in the cockpit of a jet-powered skimmer craft cruising at treetop level towards the Sky plantation. Your immediate objective is to take out the automated defense towers that soon loom into view. This is tricky business, since your rockets are good only at near point-blank range, and any towers you miss can rotate to deliver remarkably accurate side shots. Depending upon initial threat level setting, you may break through after just a few towers, or several, are demolished. Missions are high-visibility daylight runs, unless you're tackling the highest level—then you must face the ultimate challenge of a night attack!

Once you're past the towers, control passes to a biker—of which you carry three—lowered from the skimmer. Like your skimmer, bikes fire short-range missiles. However, now the opposition is a swarm of enemy bikers that come at you from the rear! An on-screen scanner gives just enough warning to allow maneuvering out of the way and behind the enemy—not too tough, if you can also manage to avoid smashing into a tree. Finally, someone at F.U. headquarters forgot to warn off the friendly bikers, so you can't afford to blast everything on wheels.

Game documentation claims that "every biker looks the same" and advises depending upon a "status display" for identification. Actually, friendly bikers match yours, not the enemy's, in color. Fortunately, there is no mistaking the large, haystack-shaped harvesters. Beware of letting down here. Once your targeting display locates the vulnerable point, you have just a few seconds to finish the job: On the Sky plantation, harvesters are armed!

Because you are, after all, a pro, your score is expressed in terms of pay earned—a few hundred credits for each tower, and so on. The game maintains the top five scores only for the duration of play, which is a minor annoyance, since Sky Runner hardly requires the spur of competition to entertain.

Stick controls are extremely responsive, sound effects are a worthy complement to the graphics, and game restart is quick. Threat Level has a wide range of settings, assuring a lot of challenging play and hours of Sky-blasting fun, for beginners and aces alike. *(Spinnaker Software Corp., One Kendall Square, Cambridge, MA 02139. C-64/$29.95.)*

—JEFF HURLBURT
HOUSTON, TX

THE SENTRY .... A

Holding on to Energy, The Source of all Moves, Is the Name of This Game

The Sentry is an old video game idea taken one step further—to three dimensions. It is addictive: I played four games and had to force myself to stop. Sentry is one of the best arcade-style games I own.

You take on the role of a robot sent in to destroy the rogue and killer robot, Sentry. She sits at the highest point in each maze or landscape level—of which there are 10,000—and kills by draining energy. Landgazers assist in finding and destroying you before you can reach her.

The object of the game is to move your robot self to a point where you are above the Sentry and then absorb her energy—easier said than done, since the Sentry is out to get you first.

You must always move quickly, so as not to be spotted and lose energy. This ►

REPORT CARD

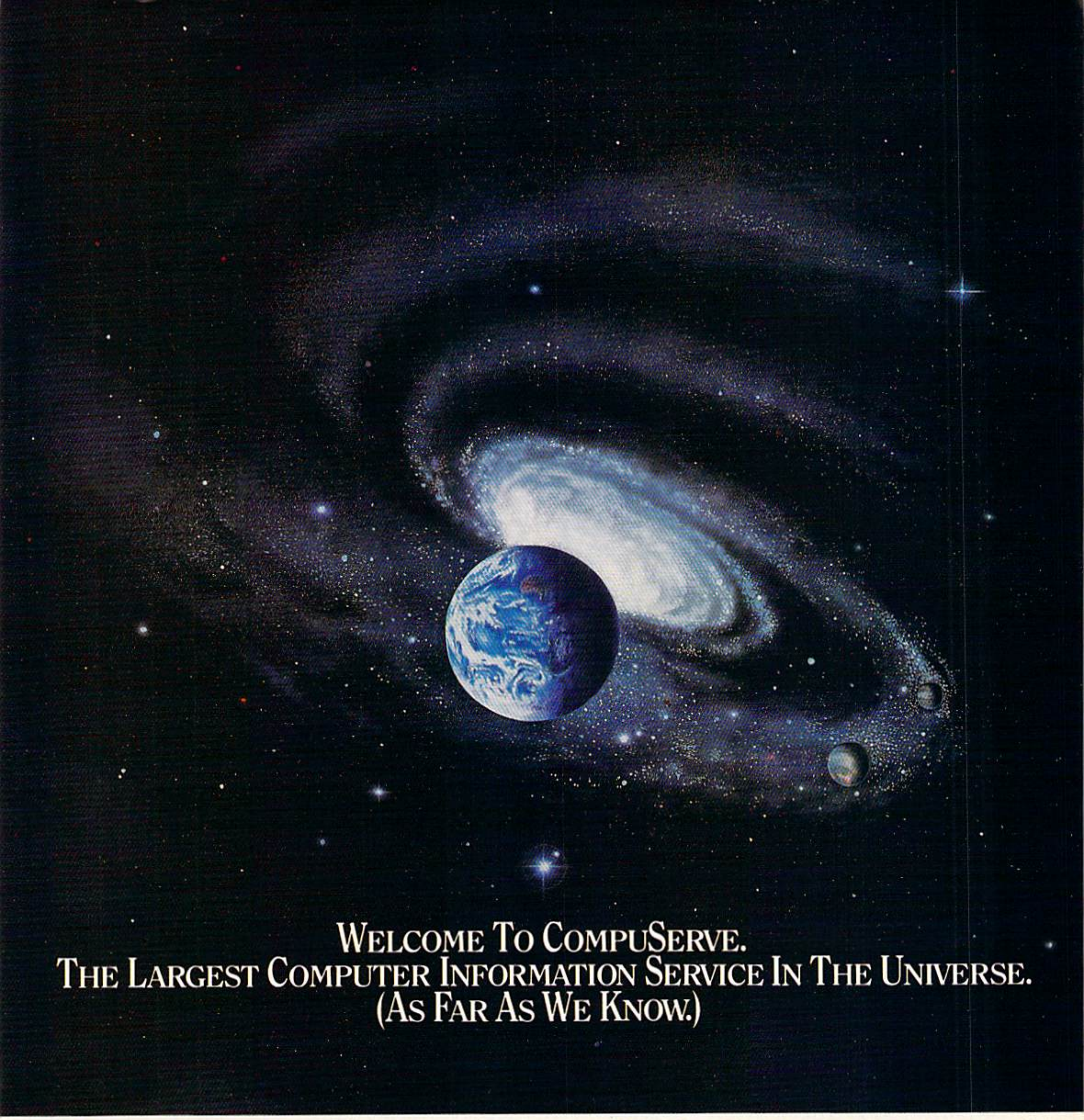
A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles, headaches or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!



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challenging and tension-building tactic is an effective one. However, you can pause the game if you need a break.

In order to move within the Sentry's environment, you have to create a robot. To aid in placing the robot, you're given a set of crosshairs to work with. However, you must place the crosshairs on the square to which you wish to move before you create a robot.

Strategy is important in The Sentry, because bad placement of your robot can trap you in an area you can't escape from. You can only escape if you have enough energy left to hyperspace out. The hyperspace is also a good way to avoid The Sentry's scans and stares.

You can gain additional energy by absorbing items in your path: trees, boulders, old robots and anything that's after you. You can create those items too, but you have to be on the same maze level or higher than the object you want to absorb. It can be frustrating until you get the hang of it, but I'm sure most videophiliacs will rise to the challenge.

The graphics in this program are outstanding—surrealistic and attractive—and easy to work with. Your vision is that of your robot's; you see everything your robot sees, including distortions. To see more, you simply rotate the robot. An indicator at the top of the screen shows how much energy you have, and a scan indicator tells you when you're being scanned.

Play is smooth, although sometimes frustrating. The Sentry is exciting, fast paced and not soon likely to bore you. With 10,000 landscapes to work with, you won't lack for variety.

Each landscape past the first is given a password that can be discovered only by solving the previous level. You can start at any level, provided you have the password, so you don't have to repeat each time you play. I recommend The Sentry to anyone who likes maze games and puzzles. *(Firebird Software, Inc., PO Box 49, Ramsey, NJ 07446. C-64/$39.95.)*

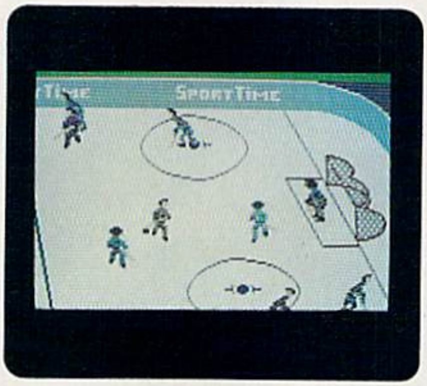
—MIKE HINSHAW
TULSA, OK

SUPERSTAR ICE HOCKEY .... A+

Follow That Puck Into The Playoffs to Capture The SportTime Cup

When most people think of ice hockey, they think of a physical, bone-crushing sport. But there's much more to it than that, and Mindscape's SuperStar Ice Hockey does an incredible job of capturing it. It's one of the most complete sports simulations I've ever seen for the C-64.

SuperStar Ice Hockey combines three distinctly different elements of professional ice hockey—on-ice action, coaching strategy and front-office decision-making—into one very impressive package. The premise of the program is explained at the start of the instruction manual in a letter from the SportTime Hockey League to you, the applicant for a new franchise.



Whether you're player, coach or manager, your goal is the SportTime Cup.

The letter states that your application has been granted and your franchise will be one of four expansion teams accepted by the 16-team league. The letter goes on to explain that, through recruiting, trading or training players, you must improve your team and make it competitive with the established teams.

The improvement process is very clever: It's based on the 250 trading points all new franchises are awarded. Making trades, recruiting players or sending your team to training camp all subtract points from your total.

SuperStar Ice Hockey gives you the information you'll need to make shrewd judgements while trying to improve your team. Every player in the league is listed on a team roster that rates his skill level in a number of important areas—speed, skating ability, shooting accuracy and checking. The roster information even includes each player's age, which may have a bearing on his stamina. You can see the effects of these ratings when you get into the arcade action part of SuperStar Ice Hockey.

A good coach will know which of his players are his best shooters, fastest skaters or hardest checkers. It's up to the coach to decide which players complement each other—and will therefore make the best offensive/defensive linemates—and how long each player should stay on the ice.

The coach has a chance to change lines every time play is stopped for a faceoff. The monitor screen provides critical information such as the overall skill and energy levels of the offensive and defensive lines that are currently on the ice. A good coach will change strategy according to the players he has out on the ice.

The crowning touch of SuperStar Ice Hockey is that it lets you be one of the players. With the use of one or two joysticks, you can play goalie or center against the computer or a human foe. You can even play one position while a friend plays the other and then tackle the computer together.

Joystick operation is a pleasure because response is smooth and predictable. Both the goalie and center can go through a full range of motions. Images are basically flicker-free and character movement is very realistic. Both the players and the puck move much as they do in real ice hockey. Once you've memorized the techniques for shooting or passing the puck, they work well.

I found SuperStar Ice Hockey's number of options, attention to detail and logical, menu-driven functions to be nothing short of amazing. Because it offers so much, the program will be most appreciated by true-blue ice hockey fans willing to take the time to explore and use all of its features. But even on its most elemental level—as an arcade action sports simulation—SuperStar Ice Hockey is a winner. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$34.95.)*

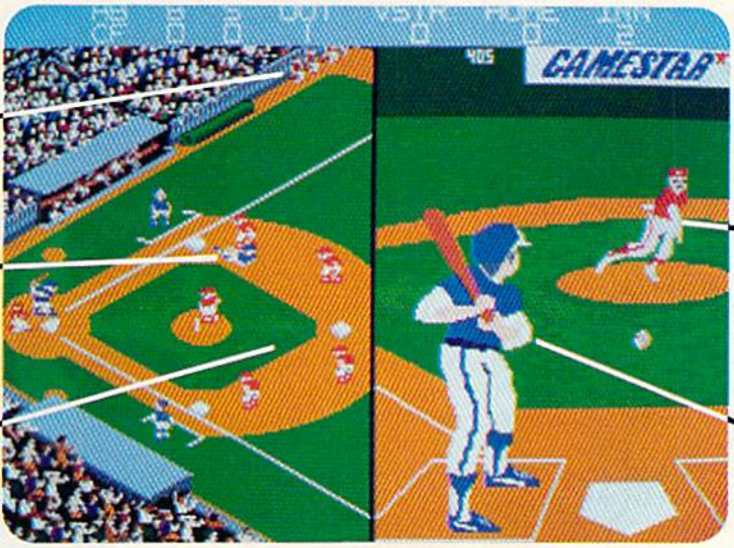
—SCOTT WASSER
WILKES-BARRE, PA

TICKET TO LONDON and TICKET TO PARIS .... B+

Don't Worry About Losing Your Traveler's Checks On This Trip

Accuracy and detail are the words that best characterize a pair of unique travel adventures from Blue Lion Software. Ticket to London and Ticket to Paris are the first in a planned series of programs that provide you with the opportunity to visit foreign capitals without leaving the comfort of your computer chair. ►

You Told Us What The Best Computer Baseball Game Would Have


"Great graphics"
"Relief pitchers —and subs"
"I like to slide —even head first."
"Let me see what's happening on the whole field."
"I want to play in the series!"
GAMESTAR
"I want to be able to throw a lot of different pitches."
"Put me right at the plate when I'm batting."

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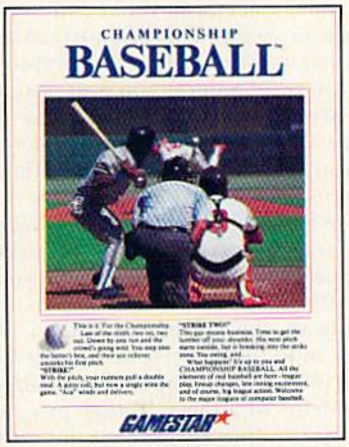
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BASEBALL™
GAMESTAR

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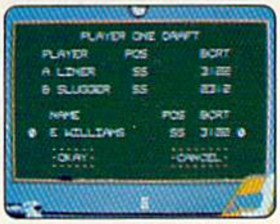
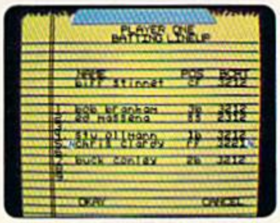


```
PLAYER ONE DRAFT
PLAYER      POS      BCRT
A LINER     SS       3122
B SLUGGER   SS       2312

NAME             POS BCRT
E WILLIAMS       SS  3122

-OKAY-          -CANCEL-
```

Select your players from the talent pool, based on their characteristics and skill ratings. Name them after today's stars, or anyone you want.



```
PLAYER ONE
BATTING LINEUP

NAME            POS BCRT
Biff Stinnet    CF  3212

Bob Branham     3B  3212
Ed Massena      SS  2312
Stu Dillmann    1B  3212
Chris Clardy    RF  3221
Buck Conley     2B  3212

OKAY                CANCEL
```

Determine the batting order that will have the best chance against your opponent.

Batting window disappears when the ball's in play, so you can see continuous action.

GAMESTAR

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IBM is a trademark of International Business Machines Corporation. Tandy is a trademark of Tandy Corporation. Atari and ST are trademarks of Atari Corporation. Apple is a trademark of Apple Computer.

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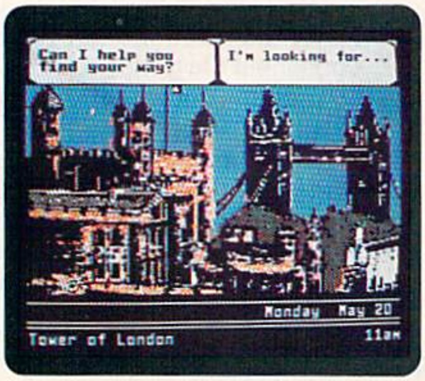
Aimed at both the tourist and the student who wish to study the language, history and culture of these cities, the programs try hard to recreate the experience of actually being abroad.

In Ticket to London, you arrive at Victoria Station for a ten-day holiday. Unfortunately, you find that the travel agency representative who holds your return ticket won't hand it over until you play a little game to discover the identity of a famous British person. Ticket to Paris gives you two weeks to locate your missing cousin and persuade him to return to the U.S.

Anyone who has visited either city will be amazed at how realistic the adventures are. The graphic screens that depict each location were created by digitizing actual photographs. The programs' accuracy extends right down to your being overcharged if you try to pay for something in American dollars instead of French francs or British pounds.

One of the first things you must do upon your arrival in London is find out which of four hotels has your prepaid reservation. In Paris, you're free to choose your lodging, provided there is a room available at a price you can afford.

Because you're a visitor, you must participate in the usual rituals of changing money and making your way around a new city.



Play tourist and sleuth while you uncover identities in Ticket to London.

While visiting Paris, you must also remember to eat and sleep or you'll fall victim to exhaustion. This program even keeps track of the nutritional value of the food you eat! Also be careful not to act out your secret dreams and live like a king at the Grand Hotel or spend like a millionaire at the Barbican Centre. The true-to-life realism of the games requires you to budget your money, lest you run out of funds.

As in real life, you may choose to spend your days shopping, visiting museums and other tourist hot spots or eating and drinking. The only difference is that you won't find yourself arguing with your spouse or kids about what to do next. Not to worry, for they can play too—the programs allow several different players to record their preferences and progress.

Using a full-screen map to navigate, you'll travel the city on foot or by subway and cab. You'll encounter people who ask you questions about local history, literature or the language. Don't be surprised if a London bobby asks you to name the opera that made soprano Joan Sutherland famous!

Questions like these appear at odd intervals in cartoon-like balloons. After you've answered several questions correctly, clues and hints appear at the bottom of the screen.

While many of the over 2000 British or French facts stored on the program disk seem somewhat arcane, you're still certain to learn a lot about these two cities before your trip is over.

Just because you manage to identify the mystery person or bring your cousin home doesn't mean you're finished with these programs. The software remembers which questions you've answered and gives you new puzzles on your next trip.

My only complaint is that the primitive copy-protection scheme bangs the head of the disk drive when the program first loads.

My impression that these programs aren't the sort of adventures that will appeal to the sub-teen set is borne out by Blue Lion's registration cards, which indicate the average user is in his or her mid-thirties. However, Ticket to Paris should be popular with language students of all ages. Either program is a worthwhile investment for anyone wishing to prepare for or relive a trip abroad. *(Blue Lion Software, PO Box 650, Belmont, MA 02178. C-64/$29.95 ea.)*

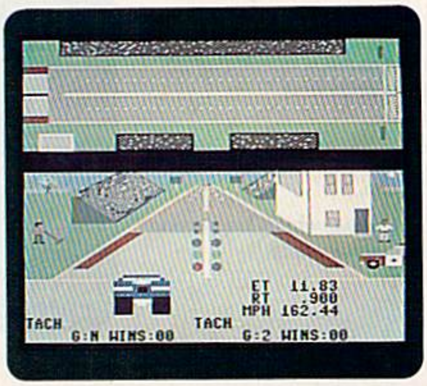
—John Premack
Lexington, MA

DRAG RACE ELIMINATOR .... C+

The Crowd Awaits
The Green Light,
And . . . They're Off!

With computer simulations already available for nearly every spectator and participatory sport in this country, it's amazing it took so long to produce a simulation of the very popular sport of drag racing.

Perhaps because it's the first simulation of that sport, Drag Race Eliminator will be a welcome addition to some Commodore owners' software libraries. However, it has some problems, one being that the game play is rather simplistic. The object—as it is in real drag racing—is to get from starting line to finish line as quickly as possible. It is unlike real drag racing, though, where factors such as track and weather conditions and automotive engineering play major roles.



Your car's engine roars, and the lights cycle to green as you begin Drag Race Eliminator.

You can choose one of five classes in which to compete. The classes determine whether the cars have two-, three- or four-speed transmissions. You also choose whether you'll be competing against another player, the computer or just practicing.

Regardless of your choices, you're presented with a split screen showing two views of the two-lane dragstrip. At the top of the screen is an overhead view of the track. At the bottom, there's a ground-level view of the track as it would appear from behind the starting line.

After easing your drag racer to the staging area, you watch as the row of lights cycles from yellow to green. Your elapsed time is determined by how quickly you react to the green light and how smoothly you shift gears while tearing down the simulated quarter-mile dragstrip.

Engine speed is increased by holding down the joystick's fire-button. The engine will blow if you let its RPMs get too high. The key is to keep the engine at maximum safe speed by shifting gears.

That's really all there is to it. Quick reflexes, timing and the ability to keep ►

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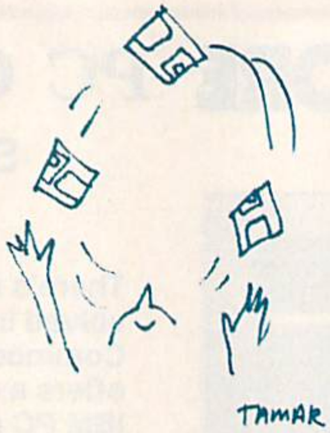

an eye on the on-screen tachometer are crucial. Drag Race Eliminator requires virtually no strategy at all, and the challenge of decreasing your elapsed times soon wears thin.

The program's graphics, which are reminiscent of early home video games, don't do much to help the program sustain interest. On-screen images are blocky, and movement is choppy. The various racers don't look very different, and when they move away from the starting line, they seem to be hopping down the track rather than smoothly accelerating.

Joystick control is also not as precise as it could have been. Very often, the dragsters skip a gear while upshifting, making it impossible to have a good run. This problem occurred with three different joysticks and three players.

Drag Race Eliminator's problems notwithstanding, the program does have some merit. Its documentation conveys a thorough understanding of drag racing, and by recording and displaying both elapsed time and reaction time, it makes it easy for players to set goals and break records.

That may not sound like much to the average computer gamer, but it may be reason enough for drag racing fans to purchase Drag Race Eliminator, especially considering the lack of alternatives. *(Family Software, 3164 Surrey Rd., Aston, PA 19014. C-64/$24.95, available by mail order only.)*

—Scott Wasser
Wilkes-Barre, PA

Dome Accounting By Computer .... A–

Accounting Made Easy for Entrepreneurs

Many accounting students have found the correction of simple mathematical errors to be the most time-consuming task in their coursework. Owners of small businesses who prepare their own books have often encountered the same difficulty. Dome Accounting by Computer largely eliminates this irritating problem—and goes a lot farther.

The Dome name comes from one of the country's most respected developers of accounting reference and record books. This software's most valuable features are its preparation of journal entries and the automatic posting of the journal's data to ledgers.

The Dome system can process the records of an enterprise that has up to 150 expense and income items on a monthly basis or up to 50 items a week. It can support up to 75 accounts, with a maximum expense/income amount of $9,999,999.99.

The program organizes the ledgers' data into excellent reports. It can produce income statements, expense and income listings and charts of accounts. The reports' information can easily be sorted by period, account, check number or the name of any company that has received one or more payments during an accounting period.

In addition to preparing the journals, ledgers and reports—the heart of any financial record system—the Dome system includes many other features. Although it doesn't calculate payroll amounts or taxes, it can keep listings of total wages, net pay and up to four deductions for as many as eight employees. It also offers a handy on-screen calculator, memo pad and calendar. The 94-page manual that accompanies the software gives helpful background information on successful bookkeeping for small businesses.

"Extremely user-friendly" is the phrase that best describes the Dome system. It is the most easily understood accounting program I have ever encountered. Even someone with very limited computing experience should have little trouble using it. Dome Publishing offers assistance on a toll-free telephone number, 30 minutes of technical support and a newsletter: all available for $14.95.

The manual does fail somewhat in its instructions for using a printer, and there appears to be a relatively unimportant programming bug that affects the printing of percentages on certain income statements.

But these problems are insignificant when compared to the total benefits of the program. The professional, the self-employed or the owner of a small business who is interested in easily preparing his own basic accounting records should definitely consider the Dome system. *(Distributed by Great American Software, Inc., PO Box 910, Amherst, NH 03031. C-64/$39.95.)*

—Walt Latocha
Oak Park, IL

Uchi Mata .... B+

Authenticity on the Mat, And on the Screen

Uchi Mata is a simulation of Judo, the martial art that revolves around grips and holds. Mindscape's is the first computer simulation of Judo that I know of, and it seems to be very realistic. It's also challenging, addictive and enjoyable to play; a program worth recommending.

Like many good computer simulations, Uchi Mata is easy to learn, but difficult to master. You can begin playing it immediately, but I recommend spending a few minutes with the five-page instruction manual, which will explain the finer points of the game, along with some background information on Judo.

As in real Judo competition, the object of Uchi Mata is to defeat an opponent by grabbing him and throwing him to the mat. Throws are judged for quality by an on-screen referee, and a competitor wins when he has accumulated a given number of quality points. Uchi Mata, named for one of the most impressive Judo throws, offers three play options: Demo, Practice and Competition modes.

The Demo mode features two computer-controlled competitors going head to head. As each performs a throw, the Japanese name for that technique appears at the bottom of the screen. This mode will familiarize you with the arena as well as enable you to learn the various Judo techniques you'll need in the other modes.

The Practice option lets you try your techniques on an opponent who will not fight back. In Competition, you compete against a more combative foe, controlled either by another player or the computer. You'll have to keep your eye on the message boards when in this mode. They indicate the gripping strength and stamina levels of both combatants.

Only when the attack indicator light shows up on the scoreboard can you throw an opponent. The longer it stays on, the easier it'll be to make a throw.

You have to be quick with your joystick to defend against your opponent's attempts to throw you. Once your feet are off the ground, it's usually too late to foil him.

Uchi Mata features above-average graphics. It's easy to see even subtle movements, such as one competitor trying to trip another. Animation is also very smooth, enhancing the realism and playability of the game. And the patterns you must follow with the joystick are very similar to the actions you want to take place on the screen.

That's important, because it's not easy to memorize the movements required for every technique. A typical throw might require you to start with the joystick centered, pull it towards you to the six o'clock position, rotate it counterclockwise to the three o'clock position and then push it to the left to center it again.

There are two such patterns to follow for every throw, depending on whether your fighter is facing left or right. To make matters worse, the instruction manual only diagrams and describes the joystick movements for four different techniques. You have more at your command, but you have to learn them through trial and error.

This may be asking a little too much of the average computer gamer. After all, if you were to enroll in a real Judo class, you could count on the instructor to teach you all the techniques sooner or later.

I have only one other complaint with Uchi Mata. On two different occasions while I was in the Competition mode, both fighters inexplicably disappeared as though they had moved off the mat that fills the screen. Pushing the joystick to one side brought them both into view within seconds and overcame this annoying bug.

Even that quirk in the program, however, didn't ruin my overall enjoyment of Uchi Mata. It's entertaining partly because it simulates a martial art that hadn't yet been tapped by computer game designers, but mainly because it does everything you expect a good computer game to do. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

HOLLYWOOD HIJINX ...... C+

It's Like, You Know,
Totally, Like,
Hollywoodish!

Hollywood Hijinx is all text and adventure. No graphics, no synthesized voices, nothing fancy. The world of Hollywood Hijinx consists of white letters on a gray screen. It could just as easily have been written for the VIC-20 as the C-64. Like a book without photos or illustrations, your imagination must create the sights and sounds in this program.

As its name implies, Hollywood Hijinx is one crazy, fast-paced text adventure, where you move from floundering in an ocean to leaping down broken patio steps to getting stuck in a maze of hedges.

Life in Hollywood Hijinx starts at 9 PM when the chauffeured limo you're riding in pulls up to the curb and you hop out. From the back seat, your Uncle Buddy's attorney tells you to meet him in the living room of the house at 9 AM. You must have all ten treasures if you want to inherit Uncle Buddy's vast Hollywood estate. The limo pulls away and leaves you, armed with only a flashlight and a note from your recently deceased Aunt Hildy. Off you go on your not-so-merry journey. Burning questions like "where is the house?" or "how are treasures identified?" or "where am I right now?" will keep you on the run. If you're looking for an easy way out, forget it.

Foremost on my list of complaints about Hollywood Hijinx is that it's extremely disk-intensive. Moving from a location or moving an object invariably causes the program to read from disk. In a typical session of 300 moves, the ►

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program accesses the drive an equal number of times. I like programs that pamper the disk drive by accessing it only when absolutely necessary.

Despite its rather primitive design, Hollywood Hijinx is one of the toughest text adventures you're likely to find. So tough that you could find yourself spending hours in fruitless pursuit of the ten treasures and consequently losing interest in it altogether. I spent a few evenings a week playing Hijinx and stopped using it mainly because of the way it was wreaking havoc with the disk drive.

To its credit, Hollywood Hijinx lets you save your current position to a data disk. It also possesses clever packaging that reads like a typical Hollywood gossip sheet for "inquiring minds." Unfortunately, sharp packaging can't compensate for a mediocre program.

The text adventure market for Commodore computers has evolved to the point where mediocrity should be unacceptable. Many excellent text adventures exist, and nearly all of the most recent programs employ animated graphics. Many use music, some use synthesized voices, and others dazzle with a combination of such features. Hollywood Hijinx does not.

Despite its weaknesses and deficiencies, I predict that this program will be a commercial success. Why? Because Hollywood is undeniably exciting and many people love anything that lets them participate in that excitement. *(Infocom, Inc., 125 CambridgePark Drive, Cambridge, MA 02140. C-64/$34.95.)*

—Tim Walsh
RUN Staff

BUREAUCRACY .... A+

"Wait in Line"

"The Check Is in the Mail"

"That's Not My Job!"

Bureaucracy is so good that I hate it. I've only played it for a few hours, and I've decided that the author is on to something. Like all great text adventures, it's exquisitely frustrating to play. Inspired by Douglas Adams, the same man who brought you The Hitchhiker's Guide to the Galaxy, Bureaucracy is the best text adventure to come my way in a long time.

The premise of the game evolves out of the fact that you've just landed a new job in a new town, and the usual paperwork hassles are bogging you down. You begin the game by going through some typical red-tape and waiting for your paycheck so you can go to France to train for your new job. You have no money, and it looks like it's going to be a long day.

Unlike other text adventures, you have a special monitor of your progress: your blood pressure. It's a good monitor of when you should sit and wait, since waiting lowers your pressure. However, many activities automatically raise it, as do wrongly stated or misspelled commands—it's likely that you'll have high blood pressure for much of the game!

Bureaucracy uses most of the standard abbreviations for the major commands, like giving directions or taking inventory. All the other commands, however, require the first nine letters of each word.

The documentation is set up with a very complex introduction from your bank. You have a copy of the letter that your new employer sent you, a passport and a few easy-to-find clues. The manual is clear and gives enough examples of play that you should have no trouble jumping right into the game. Do read the documentation, however, even if you are very familiar with text adventures, because there are clues scattered throughout.

One thing to note: This program requires an 80-column monitor. If you are in 40-Column mode, all you'll see is a message stating that you need to be in 80-Column mode.

Bureaucracy is frustrating—a perfect mirror of bureaucracy in real life. It's easy to sympathize with the character's feelings of confusion. Comments by Adams appear throughout the program and add humor to the game.

I laughed a lot as I played Bureaucracy. It will bring hours of puzzling and baffling fun to anyone who plays. It's so entertaining that you won't even notice the almost complete lack of graphics after just a few minutes of play. For all you text-adventure fans, Infocom has done it again. *(Infocom, Inc., 125 CambridgePark Drive, Cambridge, MA 02140. C-128/$34.95.)*

—Mike Hinshaw
Tulsa, OK ■

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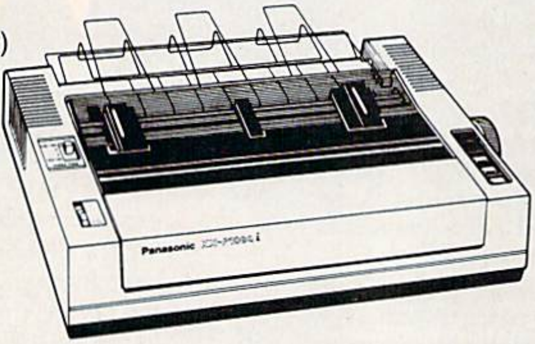

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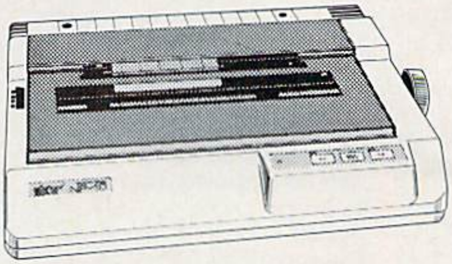

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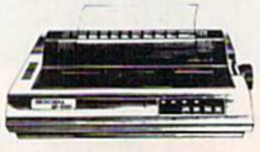

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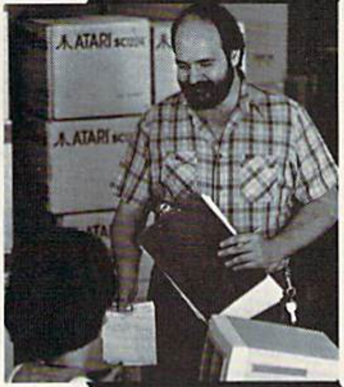

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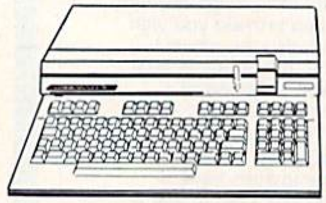

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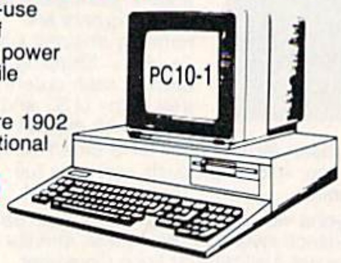

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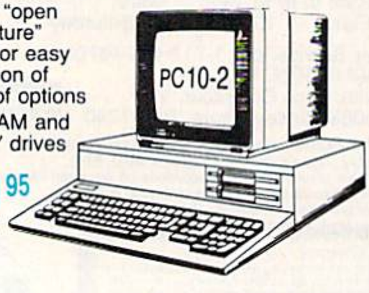

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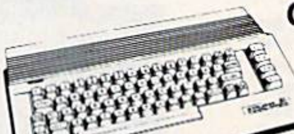

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What's 8-bit, 3½ inches and 640×200?

Commodore introduces some new numbers: the C-128D computer, the 1581 3½-inch disk drive and the 2002 video monitor.

By **LOUIS WALLACE**

COMMODORE HAS CERTAINLY been busy over the past year, bringing out new products for users of the C-64 and C-128. First it was RAM expansion and then a proportional mouse, and now we have the C-128D computer, the 1581 disk drive and the 2002 monitor. The C-128D is an ►

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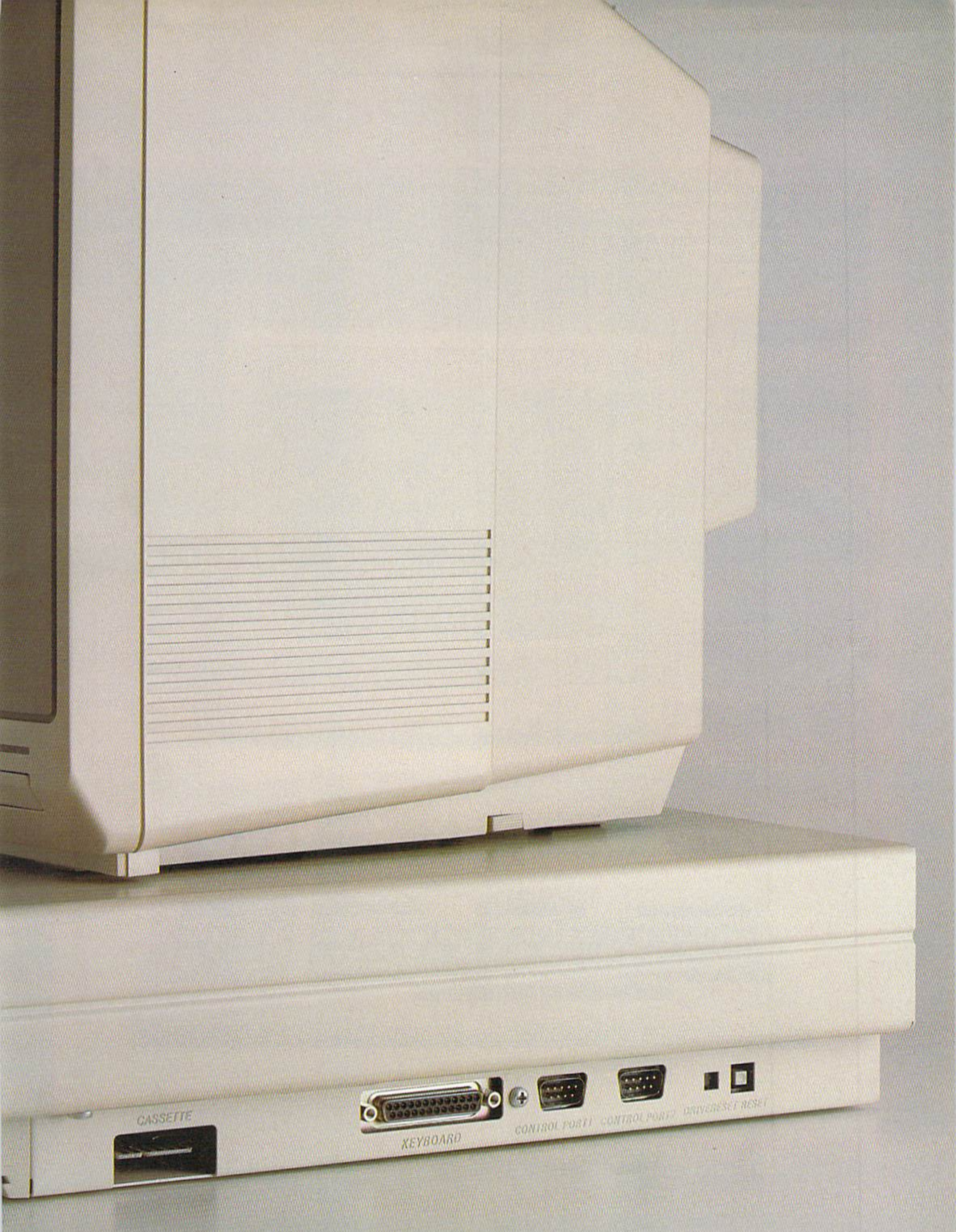
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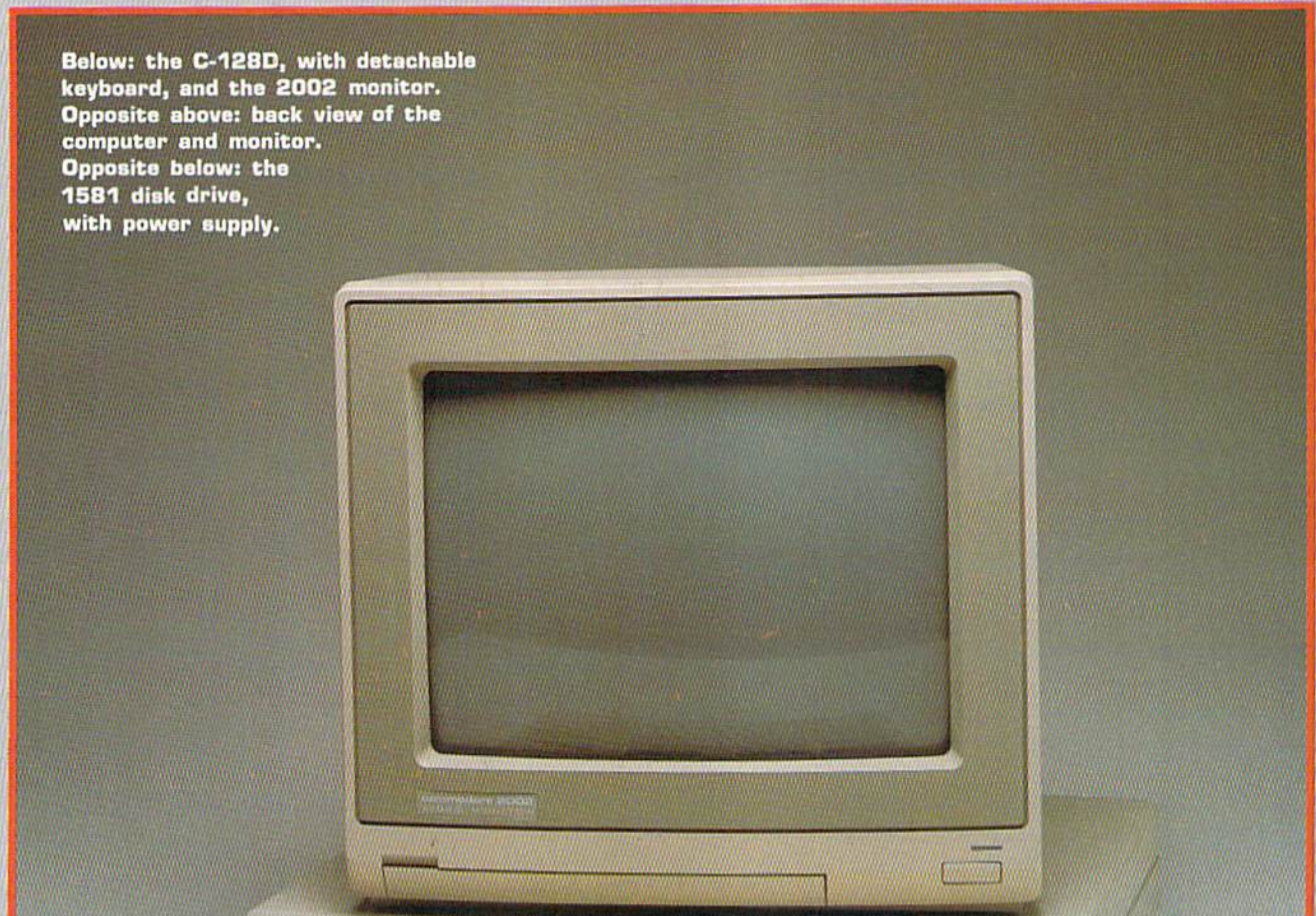


Below: the C-128D, with detachable keyboard, and the 2002 monitor.
Opposite above: back view of the computer and monitor.
Opposite below: the 1581 disk drive, with power supply.

enhanced version of the C-128 that's been popular in Europe, the 2002 works with *any* Commodore computer and the 1581 is a high-capacity, high-speed, 3½-inch disk drive.

THE C-128D COMPUTER

The long-awaited C-128D has finally made its debut here in the United States. This machine is an actual upgrade of the original C-128 (unlike the 64C, which is only a cosmetic change to the C-64), and it offers some substantial advantages over the C-128.

Just to remind you, the 128 is a multimode computer, with the equivalent of three complete computers built into its case. First is C-128 mode, which comes with 128K of RAM, the advanced Basic 7 language and a 40/80-column display. Next is C-64 mode, which lets you use almost any C-64 software or hardware on the C-128. Finally, there's CP/M mode, which enables you to run ►

many of the thousands of programs written for Digital Research's CP/M operating system.

The C-128D sports a detachable keyboard and a built-in disk drive.

EXTERNAL FEATURES

What are the differences between the C-128D and the C-128? The most obvious are in the external design. Looking more like an Amiga 1000 than a C-128, it sports a detachable keyboard and a built-in 1571 disk drive. The computer itself functions as a monitor stand, saving you the expense of buying a stand and using a somewhat smaller area on your desk. The overall appearance is that of a professional, business-oriented computer.

All the switches, ports and sockets found in the C-128 are present in the C-128D, although some (notably the power switch and the cassette and joystick/mouse ports) have been moved. In addition, there's a port for the keyboard and a reset switch for the disk drive. Unfortunately missing, however, are the external DIP switches for changing the disk drive device number that have proved to be an excellent feature of both the 1571 and 1581 drives. These switches are a great convenience, because they make the settings permanent, as opposed to the software switch, which must be redone every time you boot.

The C-128D's case is made of metal, which is good for both shielding RF interference and as a heat sink for radiating the computer's heat into the air. The heat sink function is especially important, as the C-128D's power supply is internal, and it has no built-in fan. I found that the area where the power supply is located became very warm to the touch after ten hours of continuous use. Fortunately, the heat didn't seem to affect the operation of the computer, but without the metal case, it might be a problem.

You can install the standard C-128 peripherals, such as the 1750 RAM expander, the 1670 modem and the 1351 mouse, just as you would on the regular C-128, and they work exactly the same.

The C-128D keyboard is connected to the computer via a 24-inch cable. Having the keyboard detached like this is a distinct advantage, because you can shift it to the most convenient position without having to move the entire machine. The keyboard also has fold-down feet, so you can work with it at an angle. Otherwise, it's a standard C-128 keyboard.

The C-128D's disk drive, as I mentioned previously, is a 1571. It takes double-sided disks and supports the same high-speed data transfers as the regular 1571. As with the C-128, you can daisy-chain up to four disk drives with the C-128D, including the one that's built in. I chained an external 1571 and a 1581 as devices 9 and 10.

Having the built-in disk drive could be a disadvantage if it breaks down, since you'd have to send the whole computer in for service, leaving you with no computer capability, even if you have an extra drive.

INTERNAL FEATURES

The C-128D has some internal changes, also. It comes with the new C-128 and 1571 upgrade ROMs, which correct some bugs in the earlier ROMs. (Owners of older C-128s can have these chips installed in their machines by authorized Commodore service centers for the price of the chips and installation.) The C-128D also comes with 64K of RAM for the 8563 80-column display adapter, instead of the original 16K on the C-128. With this additional 80-column video RAM and proper third-party software, you can produce stunning 640 × 200 bitmap color graphics (see cover picture) in 80-Column mode, as well as even larger virtual screens.

Packaged with the C-128D is its *System Guide* (virtually the same as the C-128 guide), the *1571 User's Guide* and a catalog of Commodore software and hardware. The accompanying software includes the 1571 Test/Demo Disk (a collection of useful and instructive programs), the CP/M operating system, the C-128 tutorial disk and terminal software for accessing QuantumLink, the Commodore-specific on-line service.

So, who will buy the C-128D? At $549, its price is a little high (especially in comparison to the Amiga 500), but the manufacturer's price of Commodore computers is usually discounted to various degrees by the retailers that sell them. I wouldn't be surprised to see the price drop rapidly to the $425–$450 range.

This machine will appeal to the C-128 buyer who'd prefer a professional-looking computer with smaller desk space requirements. Like the regular C-128, it will also appeal to the C-64 owner who wants to upgrade to a fast 80-column computer with a disk drive of larger capacity, but doesn't want to give up the C-64 software and hardware he or she has collected over the years.

I'd recommend the regular C-128 to any buyer who wants a reasonably priced computer supported by good productivity software and a large base of general-interest software (the C-64's). All these reasons apply to the C-128D, as well. The distinctive features of the C-128D are a matter of personal choice. If you already have a disk drive and don't care to have a second, the built-in drive on the C-128D will have little appeal for you. If you want professional appearance, enhanced graphics capabilities and an integrated computer and disk drive, then the few extra dollars will be money well spent.

THE 1581 DISK DRIVE

The 3½-inch disk drive is rapidly becoming the standard in the computer industry. Virtually

The 1581 disk drive has a whopping 808K of available storage.

every new computer has one built in or available as an option. So, it's no surprise that your C-64 and C-128 have joined the club.

The 1581 (suggested list price, $249.95) is an attractively styled 3½-inch disk drive that weighs about three pounds and measures a mere 8½ × 5 × 2½ inches. I find it an excellent machine for the C-64 and C-128.

It requires double-sided disks, which are a little more expensive than single-sided, but, of course, they hold twice as much. The disks it uses are completely enclosed in a rigid plastic case that will protect them from some environmental damage (dust, water, bending, and so forth) that would ruin a 5¼-inch floppy.

The drive comes with an external power supply that can sit on the floor, like that for your C-64 or C-128. The independence of the power supply is especially nice, because you don't have to worry about the drive overloading the computer's power supply.

POWERFUL FEATURES

A number of features make the 1581 very attractive. The first is its whopping 808,000 bytes (808K) of available storage. This is almost as much as five 1541 disks and more than two 1571 disks will hold! Imagine the possibilities. You could keep your word processor and dictionary, plus hundreds of pages of text or all your favorite games and educational programs on one disk. Instead of storing only a couple of dozen high-resolution pictures, as on your 1541 or 1571, you'd have room for nearly 100. If you use your Commodore for database applications, you could fit an enormous number of records on a single disk.

But disk capacity is only part of the story; there are other new and powerful features built into the 1581. For example, it can handle many more directory entries than the 1541 or 1571, which are limited to 144 each. The 1581 directory can hold up to 296 entries, but the number of files on the disk can actually exceed that, because this drive has another new feature—disk partitioning!

DISK PARTITIONING

Partitioning means functionally breaking up the disk into several areas that behave like independent disks. The main directory (called the root directory) lists the partitioned areas, and each of the areas can have its own subdirectory of up to 296 files. The subdirectories, in turn, can have subdirectories, enabling you to store files in a hierarchy or in functional groups.

The partitioned areas fall into a new filetype labeled CBM, as opposed to the PRG, SEQ, and so forth, files you're used to with the 1541 and 1571 drives. (Within each partitioned area, of course, you still have the PRG, SEQ and other filetypes as usual.) The CBM files are created and accessed by sending commands through the disk command channel. For example,

```
OPEN 15,8,15,"/0:PART1":CLOSE15
```

would bring up the area named PART1.

Believe it or not, different partitioned areas can work under different operating systems! For example, you could have regular CBM programs in one area and CP/M programs in another.

AND THERE'S MORE

Another new feature of the 1581 involves using the asterisk (*) character as a wild card. On a 1541 or 1571, the asterisk can match any number of trailing characters. For example,

```
LOAD"$:DAT*",8
```

would find all the filenames on a disk that start with DAT. You can do that on the 1581, but this drive offers a more powerful wild-card search. As an example, if you wanted to find all the files that ended with the suffix .bas (indicating they're Basic programs), you'd input

```
LOAD"$:*.bas",8
```

This type of pattern matching is like that used on computers with advanced disk operating systems, such as the Amiga and the IBM-PC.

If you have a C-128, the 1581 will offer you further advantages. For one, it's *fast*! Even if you're accustomed to the speed of the 1571, you'd better hold on to your hat! The 1581 is about 50 percent faster than a 1571, loading large programs at about 24 blocks per second, and it's over 15 times as fast as a 1541. The 1581 is also compatible with the new C-128 version of GEOS. (At this time there's no 1581 driver for the C-64 version of GEOS, but one will probably become available in the months ahead.)

You should be able to transfer unprotected commercial programs directly to this drive and use them as is. For protected commercial programs, the 1581 can serve as a high-density storage system. Software should soon start appearing that supports its 3½-inch format.

THE 2002 MONITOR

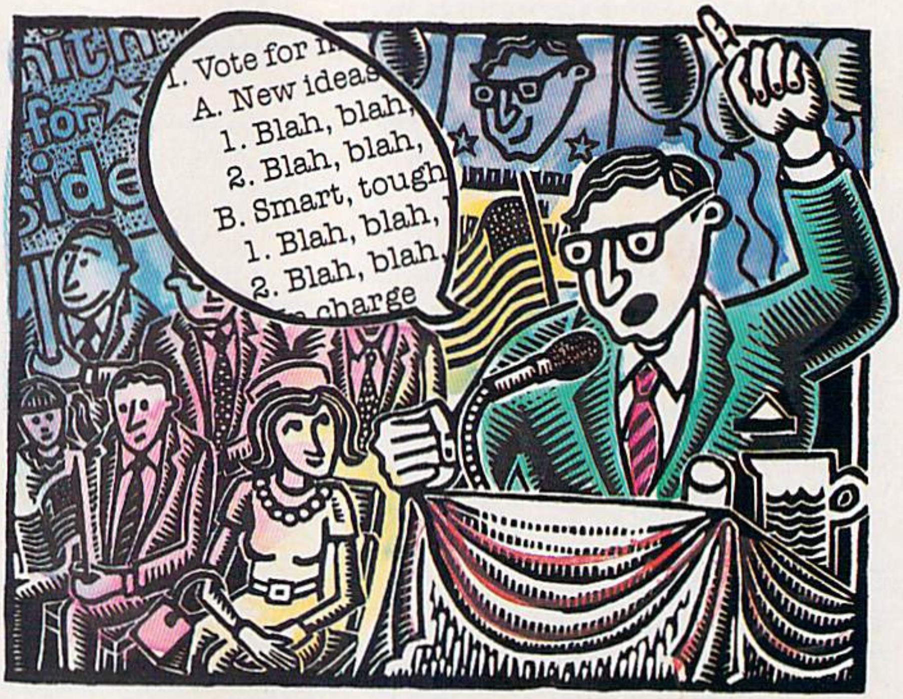
Along with the C-128D and the 1581 disk drive comes the 2002 universal monitor ($399). This unit differs from Commodore's earlier monitors in that it's designed for use with *any* of the company's computers. It has composite color inputs for the VIC-20, C-16, Plus/4, C-64 and C-128; RGBI inputs for the C-128 and PC-10; and RGBA (analog) inputs for the Amiga 500, 1000 and 2000. With a 2002, you won't need a new monitor when you upgrade your Commodore system. ■

Outline 128

When you're writing reports or preparing speeches, give your thoughts some form with this outline organizer.

◇

By GENE TOYE



Do you have trouble organizing your thoughts? Or perhaps you finish preparing a long outline and then realize the third topic should actually be a subtopic of the second. What you need is an outline processor, a program that's a cross between a word processor and a database manager, with a few new twists thrown in. An outline processor, sometimes known as a thought processor, lets you enter a list of topics, rearrange and edit them, and, finally, print the outline in the traditional hierarchical form.

I've written just such a program in Basic 7.0 for the C-128 in 80-Column mode. Called Outline 128, it offers the same major features found in commercial outline processors for the most popular computers, including the C-64, the IBM PC and the Macintosh.

WHAT IS AN OUTLINE?

If you think back to your high school English courses, you undoubtedly recall outlines. To refresh your memory, I'll review what an outline is and then describe how it's stored in a computer's memory.

An outline is a visual representation of the structure of a report, speech or other written or verbal presentation—it's a list of topics in logical order. Below each topic, you may list a series of subtopics that expand on the particular aspect to be elaborated. These subtopics are indented to separate them from the main headings. Each subtopic may, in turn, have its own list of indented subtopics. This process can be continued as many times as necessary to outline the overall subject.

In order for a computer to process an outline, it must be stored in a data structure in the computer's memory, and for this purpose the data structure commonly referred to as a tree is ideally suited.

A data tree consists of a collection of items, called nodes, that are connected in a hierarchical structure. Their relationship to one another is usually expressed in terms of parenthood. Each node has a single parent and may possess zero to many children. If a node possesses more than one child, they're referred to as siblings. A special node called the root is an ancestor of all other nodes in the tree. Unlike a natural tree, the root is usually pictured at the top of a computer tree.

This structure is easily implemented, algorithms needed to manipulate it are readily available in data structure textbooks, and, best of all, it perfectly describes an outline. The title of the outline is the root, the main topics are the children of the root and the subtopics are, in turn, children of the topics.

The only difference between the way Outline 128 treats an outline and the way you learned in school is the numbering. On paper, you'd normally number the main topics with Roman numerals, the first level of subtopics with uppercase letters, the second level with Arabic numerals and the third level with lowercase letters. Outline 128 uses Arabic numerals for all levels. However, it can write the outline to a sequential file so that you can use a word processor to insert standard numbering.

Outline 128 is written entirely in Basic 7.0. Type it in from Listing 1, using 128 Perfect Typist, and save it to disk before running it. No special steps are necessary to enter it properly.

CREATING AN OUTLINE

To use Outline 128, load the program and run it. When the title screen appears, press the return key to go to the main screen, which is divided into two parts. The upper box displays the current status of the program, and the remainder displays the level of the outline ►

ILLUSTRATED BY BETH KROMMES

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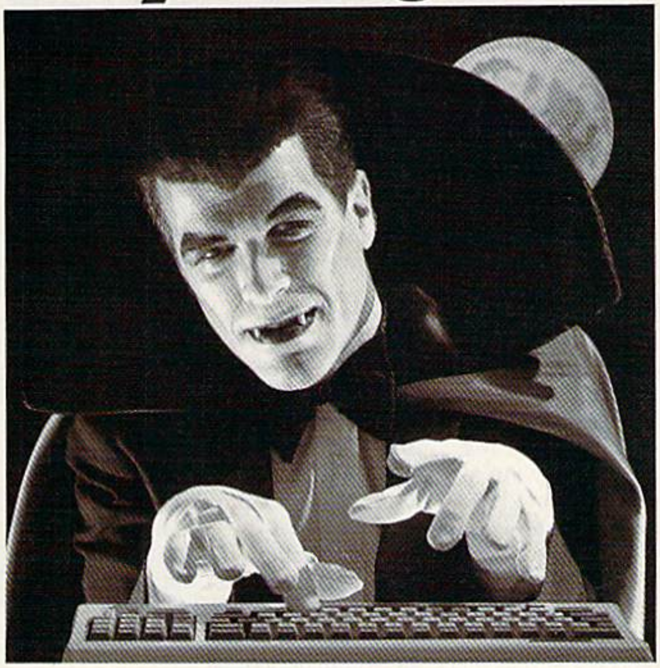
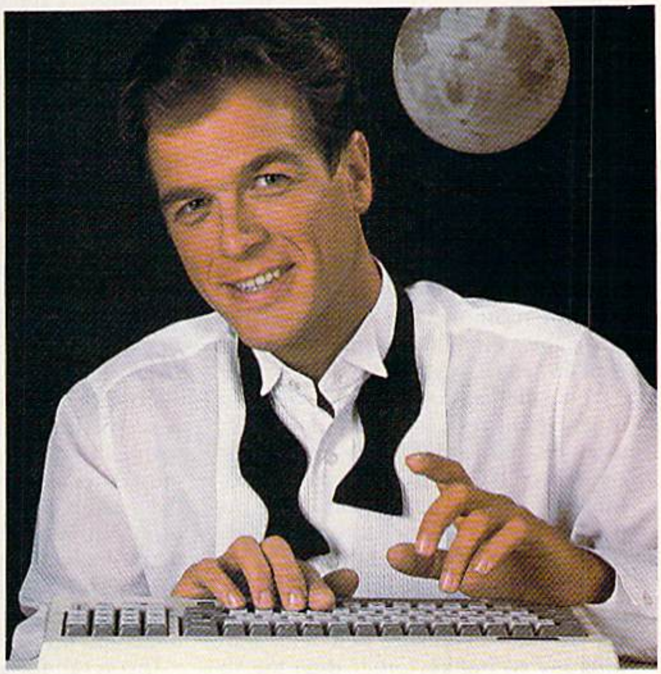


$10.00+ per hour



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									300 baud	*1200 baud*
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CompuServe	X	X	X	X	X	X	$39.95	none	$6.00	$12.50
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being worked on. The title of the current level is displayed, followed by each of its subtopics.

Up to 15 subtopics can be entered for a topic, with a maximum of 1000 topics for all levels. If a topic has less than 15 subtopics, one additional subtopic number is displayed so you can add to that outline level.

Outline 128 offers several editing keys. Cursor-up and cursor-down move the topic pointer at the left of the topics or subtopics to the level you want to edit. The F1 key advances to the level below the current one, the F3 key returns to the parent of the level displayed, F5 inserts a new topic or subtopic immediately preceding the current one, and F7 deletes the current topic or subtopic. The escape key displays the command menu, which I'll explain later.

You enter and edit topics with the usual typing keys, including the letters, numbers, punctuation marks and the return key. If you're creating a topic or subtopic, your input appears in the upper box. If the topic or subtopic already contains text, the text is displayed in the upper box for you to edit. To edit the text, start by pressing the return key. If you're entering new text, start with any typing key other than the return key.

OUTLINE 128 COMMANDS

As mentioned earlier, pressing the escape key displays a list of Outline 128 commands, which appear in the upper box of the main screen. To activate a command, press its first letter. To return to Edit mode, press any other key.

Load Outline loads a previously saved outline from disk. You must enter the filename of the outline and the device number of the drive the disk is in. If you have a dual drive, you can specify the drive by prefacing the filename with the drive number.

Save Outline saves the outline you're working on to disk. This command asks for a filename and device number, just as the load command does. Be careful not to accidentally enter a filename you've already used, because the previous file will be overwritten during the save.

Disk Directory displays the directory of the disk in the drive you specify. To pause the display, use the no-scroll key.

Print Outline prints an outline to the screen, the printer or the disk. It's printed to disk as a sequential file. You must enter a title to appear at the top of the outline, and you can choose to start the printing at the top or at the level that's currently displayed. The outline can be printed with or without topic numbers, and you can specify any indentation up to 65 characters.

If you call for an indentation that exceeds 65 characters, the affected topics and subtopics won't print out, but will be represented by three periods. You can get them to print by moving to the desired level and printing from there. Topics and subtopics automatically word-wrap as they're printed.

Clear Memory clears the current outline from memory.

Move Topic moves a topic or a subtopic and *its* subtopics from one point to another within the outline. The source for the block move is the topic pointed at when you select the command. Use the cursor keys and F1 and F3 to place the cursor just below where you want the block to go, then press return to move the block. Pressing the escape key aborts the command.

Quit exits the program. The character color is set to white and the function keys are returned to their default values.

CONCLUSION

If you'd like to learn more about data trees, I suggest you refer to *An Introduction to Data Structures*, by John Beidler, published by Allyn and Bacon. Two other excellent books on data structures are *Data Structures and Algorithms* by Aho, Hopcroft and Ullman, and *Data Structure Techniques* by Thomas Standish, both published by Addison-Wesley. Knowing the correct data structure to use for data storage within a program can greatly simplify the design and coding of a program. ®

Gene Toye, a Commodore user since 1983, is a software engineer who works with mainframe communication controllers.

Listing 1. Outline 128 program.

```
10 GOTO 2090                  :REM*250
20 BANK 15:IN$=""             :REM*160
30 SYS 65487:RREG A:IF A<>13 TH
   EN IN$=IN$+CHR$(A):GOTO 30
                               :REM*34
40 IF IN$=" " THEN IN$=""
                               :REM*90
50 RETURN                     :REM*108
60 GOSUB 340:GETKEY CM$:REM*140
70 CM=INT((INSTR("{SHFT S}S{SHF
   T P}P{SHFT L}L{SHFT C}C{SHFT
    D}D{SHFT Q}Q{SHFT M}M",CM$)
   -1)/2)+1                   :REM*102
80 IF CM=0 THEN 180             :REM*4
90 ON CM GOSUB 730,900,590,550,
   2030,120                    :REM*54
100 IF CM=7 AND IT<=N%(C) THEN
    GOSUB 1360:GOTO 180:REM*178
110 IF CM<3 THEN 180:ELSE 150
                              :REM*190
120 SC$="QUIT":GOSUB 1590
                              :REM*202
130 IF U$<>"Y" AND U$<>"{SHFT Y
    }" THEN 180               :REM*156
140 PRINT"{2 HOMEs}{SHFT CLR}{C
    TRL 2}"E$"L":TRAP:END
                               :REM*10
150 HL=-1                       :REM*8
160 IF N%(C)<15 AND F<>-1 THEN
    IT=N%(C)+1                :REM*232
170 IF N%(C)=15 OR F=-1 THEN IT
    =1:I=B%(C)                :REM*178
180 GOSUB 380:IF IT=N%(C)+1 THE
    N I=IX                    :REM*172
190 IF N%(C)<15 AND F<>-1 THEN
    PRINT USING"{CTRL 2}{3 SPAC
    Es}####.";N%(C)+1; :REM*142
200 CHAR 0,0,IT:PRINT P$;
                              :REM*160
210 GOSUB 500:WINDOW 0,8,10,24
                               :REM*90
220 GETKEY CM$:CM=INSTR(CS$,CM$
    )                         :REM*242
230 IF CM=0 THEN GOSUB 1800:GOT
    O 180                     :REM*104
240 ON CM GOTO 60,300,310,320,3
    30,280                     :REM*54
250 IF IT<N%(C) AND IT>0 THEN C
    HAR 0,0,IT,"{3 SPACEs}":IT=
    IT+1:I=X%(I):CHAR 0,0,IT,P$
    :GOTO 220                 :REM*172
260 IF IT=N%(C) AND IT<15 AND F
    <>-1 THEN CHAR 0,0,IT,"{3 S
    PACEs}":IT=IT+1:CHAR 0,0,IT
    ,P$                        :REM*21
270 GOTO 220                  :REM*241
280 IF IT>1 AND IT<=N%(C)+1 THE
    N BEGIN:CHAR 0,0,IT,"{3 SPA
    CEs}":IT=IT-1:CHAR 0,0,IT,P
    $:IF IT=N%(C) THEN I=IX:ELS
    E I=V%(I):BEND            :REM*149
290 GOTO 220                    :REM*5
300 IF IT<>0 AND IT<=N%(C) THEN
     C=I:GOTO 150:ELSE 220
                              :REM*215
310 IF I%(C)<>-1 THEN I=C:IT=U%
    (C):C=I%(C):GOTO 180:ELSE 2
    20                        :REM*211
320 IF IT<=N%(C) THEN GOSUB 163
    0:GOTO 180:ELSE 220 :REM*61
330 IF IT<=N%(C) THEN BEGIN:GOS
    UB 1690:IF IT=0 THEN 160:EL
    SE GOTO 180:BEND:ELSE 220
                               :REM*11
340 PRINT"";:WINDOW 1,1,77,3,1:
    FA=INT(FRE(1)/FM*100):REM*1
350 PRINTSPC(13)"{CTRL 9}{CTRL
    2}L{COMD 4}{CTRL 0}OAD OUTL ►
```

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```
    INE{2 SPACEs}{CTRL 9}{CTRL
    2}D{COMD 4}{CTRL 0}ISK DIRE
    CTORY{2 SPACEs}{CTRL 9}{CTR
    L 2}C{COMD 4}{CTRL 0}LEAR M
    EMORY{2 SPACEs}{CTRL 9}{CTR
    L 2}Q{COMD 4}{CTRL 0}UIT"
                         :REM*187
360 PRINTSPC(13)"{CTRL 9}{CTRL
    2}S{COMD 4}{CTRL 0}AVE OUTL
    INE{2 SPACEs}{CTRL 9}{CTRL
    2}P{COMD 4}{CTRL 0}RINT OUT
    LINE{3 SPACEs}{CTRL 9}{CTRL
     2}M{COMD 4}{CTRL 0}OVE TOP
    IC"                  :REM*237
370 PRINTSPC(13)"ANY OTHER KEY
    TO ABORT":RETURN    :REM*169
380 PRINT"":WINDOW 0,8,79,24
                         :REM*237
390 IF U%(C)<>0 THEN PRINT USIN
    G"{CTRL 2}####. ";U%(C);
                         :REM*197
400 IF I$(C)<>"" THEN PRINT"{CT
    RL 9}{CTRL 2}"LEFT$(I$(C),6
    8);E$"O{CTRL 0}";:ELSE PRIN
    T"{CTRL 9}{CTRL 2}<EMPTY>{C
    TRL 0}";              :REM*77
410 IF LEN(I$(C))>68 THEN PRINT
    ">";EL$:ELSE PRINT EL$
                         :REM*101
420 IZ=1:IX=B%(C):PRINT"{CTRL 4
    }";:IF IX=-1 THEN 490
                         :REM*177
430 DO:PRINT"{3 SPACEs}";:IF HL
    =IX THEN PRINT"{CTRL 9}";
                         :REM*103
440 PRINT USING"####";U%(IX);:P
    RINT". "LEFT$(I$(IX),68);
                          :REM*53
450 IF I$(IX)="" THEN PRINT"<EM
    PTY>";               :REM*199
460 PRINT E$"O";:IF LEN(I$(IX))
    >68 THEN PRINT"{CTRL 9}>{CT
    RL 0}";              :REM*143
470 PRINT"{CTRL 0}";EL$:IZ=IZ+1
    :IF X%(IX)<>-1 THEN IX=X%(I
    X)                   :REM*171
480 LOOP WHILE IZ<=N%(C)
                         :REM*143
490 PRINTCHR$(27);"@";:RETURN
                         :REM*237
500 WINDOW 0,0,79,3,1:FA=INT(FR
    E(1)/FM*100+.5):PRINT"{COMD
     4}"                  :REM*99
510 PRINTSPC(14)"{CTRL 9}{CTRL
    2}ESC{COMD 4}{CTRL 0} - COM
    MAND MENU "          :REM*175
520 PRINTSPC(14)"{CTRL 9}{CTRL
    2}F1{COMD 4}{CTRL 0}{2 SPAC
    Es}- NEXT{2 SPACEs}{CTRL 9}
    {CTRL 2}F3{COMD 4}{CTRL 0}
    - PREV{2 SPACEs}{CTRL 9}{CT
    RL 2}F5{COMD 4}{CTRL 0} - I
    NSERT{2 SPACEs}{CTRL 9}{CTR
    L 2}F7{COMD 4}{CTRL 0} - DE
    LETE"                :REM*178
530 WINDOW 0,4,79,7:PRINT LL$:P
    RINT"FILE:{CTRL 8}{COMD 4}"
    ;EL$;TAB(66);        :REM*122
540 PRINT USING"###% FREE MEM";
    FA:PRINT LL$:CHAR 0,7,1:PRI
    NT"{CTRL 8}";FL$;:RETURN
                          :REM*70
550 SC$="CLEAR":GOSUB 1590:IF U
    $="N" OR U$="{SHFT N}" THEN
     RETURN              :REM*174
560 WINDOW 1,1,77,3,1:PRINT"{CR
    SR DN}"TAB(35)"{COMD 4}CLEA
    RING"                 :REM*42
570 N%(0)=0:X%(0)=-1:V%(0)=-1:B
    %(0)=-1:I%(0)=-1:J%(0)=0:I$
    (0)="<TOP>":F=1       :REM*56
580 FOR A=1 TO AS-1:X%(A)=A+1:N
    EXT:X%(AS)=-1:C=0:FL$="":T$
    ="":FM=FRE(1):RETURN
                         :REM*136
590 WINDOW 1,1,77,3,1:PRINT"{CO
    MD 4}LOAD":LN$=""    :REM*254
600 PRINT"{2 SPACEs}FILENAME{2
    SPACEs}{CTRL 2}";:INPUT LN$
    :IF LN$="" THEN RETURN:ELSE
     FL$=LEFT$(LN$,16)    :REM*56
610 INPUT"{2 SPACEs}{COMD 4}DIS
    K DEVICE #{3 SPACEs}{CTRL 2
    }8{3 CRSR LFs}";D:IF D<8 OR
     D>30 THEN 610       :REM*140
620 PRINT"{SHFT CLR}{CRSR DN}"T
    AB(35)"{COMD 4}WORKING":FOR
     Z=1 TO AS:X%(Z-1)=Z:V%(Z)=
    Z-1:NEXT              :REM*56
630 V%(0)=-1:X%(AS)=-1:F=0:PRIN
    T"{SHFT CLR}{CRSR DN}"TAB(3
    4-LEN(FL$)/2)"LOADING "FL$
                         :REM*252
640 OPEN D,D,2,"0:"+FL$+",S,R":
    IF DS<>0 THEN GOSUB 2000:GO
    TO 560               :REM*236
650 INPUT#D,T$:IF DS<>0 THEN GO
    SUB 2000:GOTO 560     :REM*74
660 INPUT#D,P:IF DS<>0 THEN GOS
    UB 2000:GOTO 560     :REM*172
670 IF P=-1 THEN CLOSE D:RETURN
                         :REM*150
680 IF V%(P)<>-1 THEN X%(V%(P))
    =X%(P):ELSE F=X%(P):REM*178
690 IF X%(P)<>-1 THEN V%(X%(P))
    =V%(P)               :REM*236
700 INPUT#D,N%(P),X%(P),V%(P),B
    %(P),I%(P),U%(P):IF DS<>0 T
    HEN 2000             :REM*100
710 INPUT#D,I$(P):IF DS<>0 THEN
     GOSUB 2000:GOTO 560:REM*40
720 GOTO 660              :REM*20
730 WINDOW 1,1,77,3,1:PRINT"{CO
    MD 4}SAVE"            :REM*22
740 PRINT"{2 SPACEs}FILENAME{2
    SPACEs}{CTRL 2}"FL$:PRINT"{
    CRSR UP}{10 CRSR RTs}";:INP
    UT FL$               :REM*120
750 IF FL$="" THEN RETURN:ELSE
    FL$=LEFT$(FL$,16)    :REM*170
760 INPUT"{2 SPACEs}{COMD 4}DIS
    K DEVICE #{3 SPACEs}{CTRL 2
    }8{3 CRSR LFs}";D:IF D<8 OR
     D>30 THEN 760        :REM*78
770 PRINT"{SHFT CLR}{CRSR DN}"T
    AB(35-LEN(FL$)/2)"{COMD 4}S
    AVING "FL$           :REM*171
780 OPEN D,D,2,"@0:"+FL$+",S,W"
    :IF DS<>0 THEN 2000:REM*101
790 PRINT#D,CHR$(34);T$;CHR$(34
    ):SX=X%(0):IF SX=-1 THEN SX
    =I%(0)               :REM*159
800 P=0:DO UNTIL P=SX  :REM*133
810 PRINT#D,P:PRINT#D,N%(P)","X
    %(P)","V%(P)","B%(P)","I%(P
    )","U%(P)            :REM*249
820 IF DS<>0 THEN 2000    :REM*9
830 PRINT#D,CHR$(34);I$(P);CHR$
    (34):IF DS<>0 THEN 2000
                           :REM*5
840 IF B%(P)<>-1 THEN P=B%(P):E
    LSE BEGIN             :REM*89
850 IF P=-1 THEN 880:ELSE IF X%
    (P)<>-1 THEN 870     :REM*155
860 P=I%(P):GOTO 850     :REM*129
870 P=X%(P)              :REM*199
880 BEND                  :REM*55
890 LOOP:PRINT#D,-1:CLOSE D:RET
    URN                  :REM*183
900 IF B%(0)=-1 THEN RETURN
                         :REM*179
910 WINDOW 1,1,77,3,1:PRINT"{CO
    MD 4}PRINT"           :REM*55
920 PRINT"{2 SPACEs}START : {CT
    RL 9}{CTRL 2}T{CTRL 0}{COMD
     4}OP OR {CTRL 9}{CTRL 2}C{
    CTRL 0}{COMD 4}URRENT LEVEL
    "                    :REM*143
930 GETKEY PS$:IF PS$<>"T" AND
    PS$<>"{SHFT T}" AND PS$<>"C
    " AND PS$<>"{SHFT C}" THEN
    930                   :REM*93
940 PRINT"{SHFT CLR}{CTRL 9}TIT
    LE{CTRL 2}{CTRL 0}":PRINT T
    $;E$"O{HOME}{CRSR DN}";
                          :REM*39
950 GOSUB 20:T$=IN$:PRINT "{SHF
    T CLR}{COMD 4}PRINT"
                         :REM*129
960 PRINT"{2 SPACEs}{CTRL 9}{CT
    RL 2}S{CTRL 0}{COMD 4}CREEN
    , {CTRL 9}{CTRL 2}P{CTRL 0}
    {COMD 4}RINTER, OR {CTRL 9}
    {CTRL 2}D{CTRL 0}{COMD 4}IS
    K";                  :REM*241
970 GETKEY PO$:IF INSTR("S{SHFT
     S}P{SHFT P}D{SHFT D}",PO$)
    =0 THEN 970          :REM*137
980 IF PO$="S" OR PO$="{SHFT S}
    " THEN OF$="":D=3:SA=0
                         :REM*229
990 IF PO$="D" OR PO$="{SHFT D}
    " THEN BEGIN         :REM*233
1000 PRINT"{SHFT CLR}PRINT TO D
     ISK":INPUT"{2 SPACEs}FILEN
     AME {CTRL 2}";OF$  :REM*37
1010 IF OF$="" THEN 1000 :REM*5
1020 OF$="@0:"+OF$+",S,W"
                          :REM*49
1030 INPUT"{2 SPACEs}{COMD 4}DE
     VICE #{3 SPACEs}{CTRL 2}8{
     3 CRSR LFs}";D:IF D<8 OR D
     >30 THEN 1030       :REM*116
1040 SA=3:BEND            :REM*38
1050 IF PO$="P" OR PO$="{SHFT P
     }" THEN BEGIN:OF$="":D=4
                         :REM*148 ►
```

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```
1060 PRINT"{SHFT CLR}PRINT TO P
     RINTER"                :REM*54
1070 INPUT"{2 SPACEs}{COMD 4}SE
     CONDARY ADDRESS{3 SPACEs}{
     CTRL 2}7{3 CRSR LFs}";SA:I
     F SA<0 OR SA>255 THEN 1060
                            :REM*48
1080 BEND                   :REM*0
1090 PRINT"{SHFT CLR}{COMD 4}PR
     INT"                  :REM*114
1100 INPUT"{2 SPACEs}INDENT (0
     TO 20){3 SPACEs}{CTRL 2}5{
     3 CRSR LFs}";IL:IF IL<0 OR
      IL>20 THEN 1090     :REM*2
1110 PRINT"{SHFT CLR}{COMD 4}PR
     INT"                  :REM*134
1120 INPUT"{2 SPACEs}ITEM NUMBE
     RS ({CTRL 2}Y{COMD 4}/{CTR
     L 2}N{COMD 4}){3 SPACEs}{C
     TRL 2}Y{3 CRSR LFs}";PN$
                           :REM*130
1130 IF PN$="Y" OR PN$="{SHFT Y
     }" THEN PN=1:ELSE IF PN$<>
     "N" AND PN$<>"{SHFT N}" TH
     EN 1110:ELSE PN=0 :REM*244
1140 PRINT"{SHFT CLR}{COMD 4}PR
     INT{CTRL 2}":WINDOW 0,8,79
     ,24,1                 :REM*206
1150 OPEN D,D,SA,OF$:ID=0:LC=0:
     PR$=T$:IF PN=1 THEN NS=6:E
     LSE NS=0               :REM*48
1160 GOSUB 1960:PRINT#D,PL$:LC=
     LC+1:IF PR$<>"" THEN 1160
                            :REM*4
1170 PRINT#D:PRINT#D:LC=LC+2
                            :REM*22
1180 IF PS$="T" OR PS$="{SHFT T
     }" THEN SP=B%(0):SX=-1:GOT
     O 1200                 :REM*56
1190 SP=C:SX=X%(SP):IF SX=-1 TH
     EN SX=I%(SP)          :REM*222
1200 P=SP:DO UNTIL P=SX:REM*214
1210 IF ID>65 THEN PRINT#D,SPC(
     70)". . .":LC=LC+1:GOTO 12
     60                     :REM*80
1220 PRINT#D,SPC(ID);:IF PN THE
     N PRINT#D,USING"####. ";U%
     (P);                  :REM*106
1230 PR$=I$(P)              :REM*14
1240 GOSUB 1960:PRINT#D,PL$:LC=
     LC+1                   :REM*52
1250 IF D=3 AND LC=14 THEN GOSU
     B 1910:WINDOW 0,8,79,24,1:
     LC=0:PRINT"{CTRL 2}";
                           :REM*222
1260 IF PR$<>"" THEN PRINT#D,SP
     C(ID+NS);:GOTO 1240
                           :REM*144
1270 IF D>7 AND DS<>0 THEN 2000
                           :REM*114
1280 IF B%(P)<>-1 THEN P=B%(P):
     ID=ID+IL:ELSE BEGIN :REM*3
1290 IF P=-1 THEN 1340:ELSE IF
     X%(P)<>-1 THEN 1320:REM*57
1300 P=I%(P):ID=ID-IL     :REM*97
1310 GOTO 1290              :REM*43
1320 P=X%(P)               :REM*139
1330 BEND                  :REM*251
1340 LOOP:CLOSE D:IF D=3 AND LC
     <>0 THEN GOSUB 1910
                           :REM*151
1350 RETURN                :REM*133
1360 IF IT=0 THEN RETURN
                           :REM*215
1370 MS=I:ML=C:WINDOW 1,1,77,3,
     1:PRINT"{COMD 4}MOVE"
                           :REM*151
1380 PRINT"{2 SPACEs}ITEM TO MO
     VE = ";IT             :REM*175
1390 PRINT"{2 SPACEs}{CTRL 9}{C
     TRL 2}F1{COMD 4}{CTRL 0} -
      NEXT{2 SPACEs}{CTRL 9}{CT
     RL 2}F3{COMD 4}{CTRL 0} -
     PREV{2 SPACEs}{CTRL 9}{CTR
     L 2}RETURN{COMD 4}{CTRL 0}
      - SELECT{2 SPACEs}{CTRL 9
     }{CTRL 2}ESC{COMD 4}{CTRL
     0} - ABORT";          :REM*137
1400 HL=I:GOTO 1420        :REM*141
1410 IF N%(C)<>0 THEN IT=1:I=B%
     (C):ELSE IT=0         :REM*159
1420 GOSUB 380:IF IT<>0 THEN CH
     AR 0,0,IT,"{CTRL 8}M{SHFT
     *}>"                  :REM*217
1430 GETKEY CM$:CM=INSTR(CS$+CH
     R$(13),CM$):IF CM=0 THEN 1
     430                   :REM*123
1440 ON CM GOTO 1580,1480,1470,
     1430,1430,1460,1450,1500
                            :REM*47
1450 IF IT<N%(C) AND IT>0 THEN
     CHAR 0,0,IT,"{3 SPACEs}":I
     T=IT+1:I=X%(I):CHAR 0,0,IT
     ,"{CTRL 8}M{SHFT *}>":GOTO
      1430:ELSE 1430      :REM*235
1460 IF IT>1 THEN CHAR 0,0,IT,"
     {3 SPACEs}":IT=IT-1:I=V%(I
     ):CHAR 0,0,IT,"{CTRL 8}M{S
     HFT *}>":GOTO 1430:ELSE 14
     30                    :REM*185
1470 IF I%(C)<>-1 THEN I=C:IT=U
     %(C):C=I%(C):GOTO 1420:ELS
     E 1430                 :REM*97
1480 IF IT<>0 AND IT<>MS THEN C
     =I:GOTO 1410:ELSE 1430
                           :REM*103
1490 IF I=MS THEN 1430 :REM*181
1500 PV=V%(MS):NX=X%(MS):IF PV<
     >-1 THEN X%(PV)=NX:ELSE B%
     (ML)=NX               :REM*221
1510 IF NX<>-1 THEN V%(NX)=PV
                           :REM*113
1520 N%(ML)=N%(ML)-1:P=NX:OF=-1
     :GOSUB 1950            :REM*43
1530 IF IT<>0 THEN PV=V%(I):ELS
     E PV=-1:I=-1          :REM*101
1540 IF PV<>-1 THEN X%(PV)=MS:E
     LSE B%(C)=MS           :REM*12
1550 IF I<>-1 THEN V%(I)=MS
                            :REM*10
1560 X%(MS)=I:V%(MS)=PV:I%(MS)=
     C:IF PV=-1 THEN U%(MS)=1:E
     LSE U%(MS)=U%(PV)+1:REM*72
1570 P=I:OF=1:GOSUB 1950:N%(C)=
     N%(C)+1                :REM*86
1580 HL=-1:IT=U%(MS):I=MS:RETUR
     N                     :REM*236
1590 WINDOW 1,1,77,3,1:PRINT"{C
     OMD 4}"SC$             :REM*98
1600 PRINTTAB(28)"{CRSR DN}{CTR
     L 3}ARE YOU SURE ({CTRL 2}
     Y{CTRL 3}/{CTRL 2}N{CTRL 3
     }) ?";                 :REM*90
1610 GETKEY U$:IF U$<>"Y" AND U
     $<>"{SHFT Y}" AND U$<>"N"
     AND U$<>"{SHFT N}" THEN 16
     10                    :REM*176
1620 RETURN                :REM*148
1630 IF F=-1 THEN RETURN:REM*20
1640 IF N%(C)=15 THEN RETURN
                           :REM*216
1650 PV=V%(I):NI=F:F=X%(F):V%(I
     )=NI:IF PV<>-1 THEN X%(PV)
     =NI:ELSE B%(C)=NI :REM*190
1660 N%(NI)=0:X%(NI)=I:V%(NI)=P
     V:B%(NI)=-1            :REM*2
1670 I%(NI)=I%(I):I$(NI)="":U%(
     NI)=U%(I)              :REM*22
1680 N%(C)=N%(C)+1:OF=1:P=I:GOS
     UB 1950:IT=U%(I):RETURN
                           :REM*166
1690 IF IT=0 THEN RETURN:ELSE H
     L=I:GOSUB 380:HL=-1:CHAR 0
     ,0,IT,"{CTRL 8}D{SHFT *}>"
                           :REM*110
1700 SC$="DELETE":GOSUB 1590:IF
      U$="N" OR U$="{SHFT N}" T
     HEN RETURN             :REM*32
1710 P=I:DO UNTIL (P=I AND B%(P
     )=-1)                  :REM*96
1720 DO WHILE B%(P)<>-1:P=B%(P)
     :LOOP:B%(I%(P))=-1:PZ=X%(P
     )                     :REM*236
1730 X%(P)=F:F=P:IF PZ<>-1 THEN
      P=PZ:ELSE P=I%(P):REM*232
1740 LOOP:PV=V%(I):NX=X%(I)
                           :REM*226
1750 IF PV<>-1 THEN X%(PV)=NX:E
     LSE B%(C)=NX           :REM*76
1760 IF NX<>-1 THEN V%(NX)=PV
                           :REM*108
1770 N%(C)=N%(C)-1:PZ=X%(P):X%(
     P)=F:F=P:P=PZ:OF=-1:GOSUB
     1950                   :REM*82
1780 IF NX<>-1 THEN I=NX:IT=U%(
     I):ELSE IF PV<>-1 THEN I=P
     V:IT=U%(I):ELSE IT=0
                           :REM*174
1790 RETURN                 :REM*62
1800 WINDOW 1,1,77,3,1:PRINT"{C
     TRL 9}{COMD 4}ITEM{CTRL 0}
     {CTRL 2}"             :REM*205
1810 IF IT<=N%(C) THEN PRINT I$
     (I);                   :REM*57
1820 PRINT E$"O{HOME}{CRSR DN}"
     ;                     :REM*217
1830 IF CM$<>CHR$(13) THEN BANK
      15:POKE 208,1:POKE 209,0:
     POKE 842,ASC(CM$) :REM*215
1840 GOSUB 20:IF IT<=N%(C) THEN
      I$(I)=IN$:RETURN :REM*141
1850 N%(C)=N%(C)+1:NI=F:F=X%(F)
                           :REM*209
1860 IF N%(C)>1 THEN X%(I)=NI:E
     LSE B%(C)=NI            :REM*9
1870 N%(NI)=0:X%(NI)=-1:V%(NI)=
     I:B%(NI)=-1            :REM*5 ►
```

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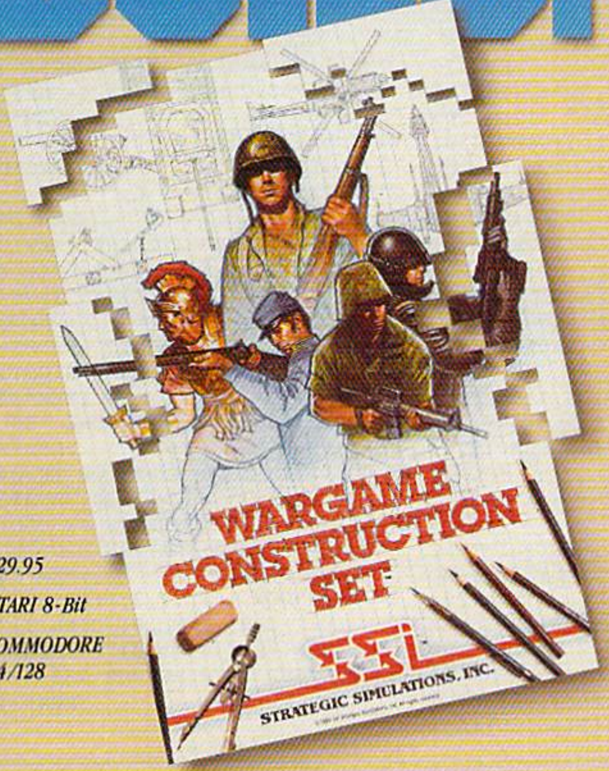

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Circle 25 on Reader Service card.

```
1880 I%(NI)=C:U%(NI)=N%(C)
                         :REM*99
1890 I$(NI)=IN$:I=NI:IF IT<15 T
     HEN IT=IT+1        :REM*127
1900 RETURN             :REM*173
1910 PRINT"":WINDOW 1,1,77,3
                        :REM*221
1920 PRINT"{HOME}{3 CRSR DNs}"T
     AB(31)"{CTRL 9}{CTRL 2}RET
     URN{CTRL 6}{CTRL 0} TO CON
     TINUE"             :REM*193
1930 GETKEY U$:IF U$<>CHR$(13)
     THEN 1930          :REM*185
1940 PRINT"{HOME}{3 CRSR DNs}"E
     L$;:RETURN         :REM*211
1950 DO WHILE P<>-1:U%(P)=U%(P)
     +OF:P=X%(P):LOOP:RETURN
                        :REM*209
1960 IF LEN(PR$)<80-ID-6 THEN P
     L$=PR$:PR$="":RETURN
                        :REM*227
1970 ZZ=80-ID-6:DO WHILE MID$(P
     R$,ZZ,1)<>" " AND ZZ>1:ZZ=
     ZZ-1:LOOP           :REM*95
1980 IF ZZ=1 THEN ZZ=80-ID-6
                        :REM*127
1990 PL$=LEFT$(PR$,ZZ):PR$=MID$
     (PR$,ZZ+1,LEN(PR$)):RETURN
                        :REM*209
2000 WINDOW 1,1,77,3,1 :REM*119
2010 PRINT"{CTRL 9}{CTRL 3}DISK
      ERROR - OPERATION NOT COM
     PLETED{CTRL 0}"    :REM*241
2020 PRINT"ERROR:{CTRL 2}";DS$:
     GOSUB 1910:CLOSE D:RETURN
                         :REM*25
2030 WINDOW 1,1,77,3,1:PRINT"{C
     OMD 4}DIRECTORY"   :REM*209
2040 INPUT"{2 SPACEs}{COMD 4}DI
     SK DEVICE #{3 SPACEs}{CTRL
      2}8{3 CRSR LFs}";D:IF D<8
      OR D>30 THEN 2030 :REM*69
2050 PRINT"{SHFT CLR}{COMD 4}DI
     RECTORY"           :REM*150
2060 PRINT"{2 SPACEs}PRESS {CTR
     L 2}{CTRL 9}NO SCROLL{COMD
      4}{CTRL 0} TO PAUSE DIREC
     TORY"              :REM*188
2070 WINDOW 0,8,79,24,1:REM*154
2080 PRINT E$"L";:DIRECTORY U(D
     ):PRINT E$"M";:GOSUB 1910:
     RETURN               :REM*4
2090 PRINT"{2 HOMEs}{SHFT CLR}"
     ;CHR$(14);          :REM*98
2100 IF RGR(1)<>5 THEN PRINT"{C
     TRL 9}80 COL REQUIRED":END
                        :REM*234
2110 FAST:PRINTCHR$(27)"M":COLO
     R 6,1:COLOR 5,2:CLR:AS=100
     0                  :REM*142
2120 DIM N%(AS),X%(AS),V%(AS),B
     %(AS),I%(AS),I$(AS),U%(AS)
                         :REM*70
2130 E$=CHR$(27):GOSUB 560:TRAP
      2190:PRINT"{2 HOMEs}{SHFT
      CLR}";E$"M";       :REM*26
2140 F1$=CHR$(133):F3$=CHR$(134
     ):F5$=CHR$(135):F7$=CHR$(1
     36)                 :REM*46
2150 KEY 1,F1$:KEY 2,"":KEY 3,F
     3$:KEY 4,""        :REM*106
2160 KEY 5,F5$:KEY 6,"":KEY 7,F
     7$:KEY 8,""        :REM*204
2170 P$="{CTRL 8}{2 SHFT *s}>":
     CS$=E$+F1$+F3$+F5$+F7$+"{C
     RSR UP}{CRSR DN}":EL$=E$+"
     Q"                  :REM*16
2180 LL$="":FOR A=1 TO 79:LL$=L
     L$+"{SHFT *}":NEXT A:GOTO
     150                :REM*232
2190 IF ER=30 THEN RESUME 150
                         :REM*22
2200 IF ER=5 OR ER=16 OR ER=24
     OR ER=41 THEN 2220 :REM*36
2210 PRINT"{2 HOMEs}{SHFT CLR}"
     E$"L"ERR$(ER)" IN LINE"EL:
     TRAP:STOP          :REM*232
2220 WINDOW 1,1,77,3,1:PRINT"{S
     HFT CLR}{CTRL 9}{CTRL 3}"E
     RR$(ER)"{CTRL 0}"   :REM*74
2230 GOSUB 1910:RESUME 150
                        :REM*240
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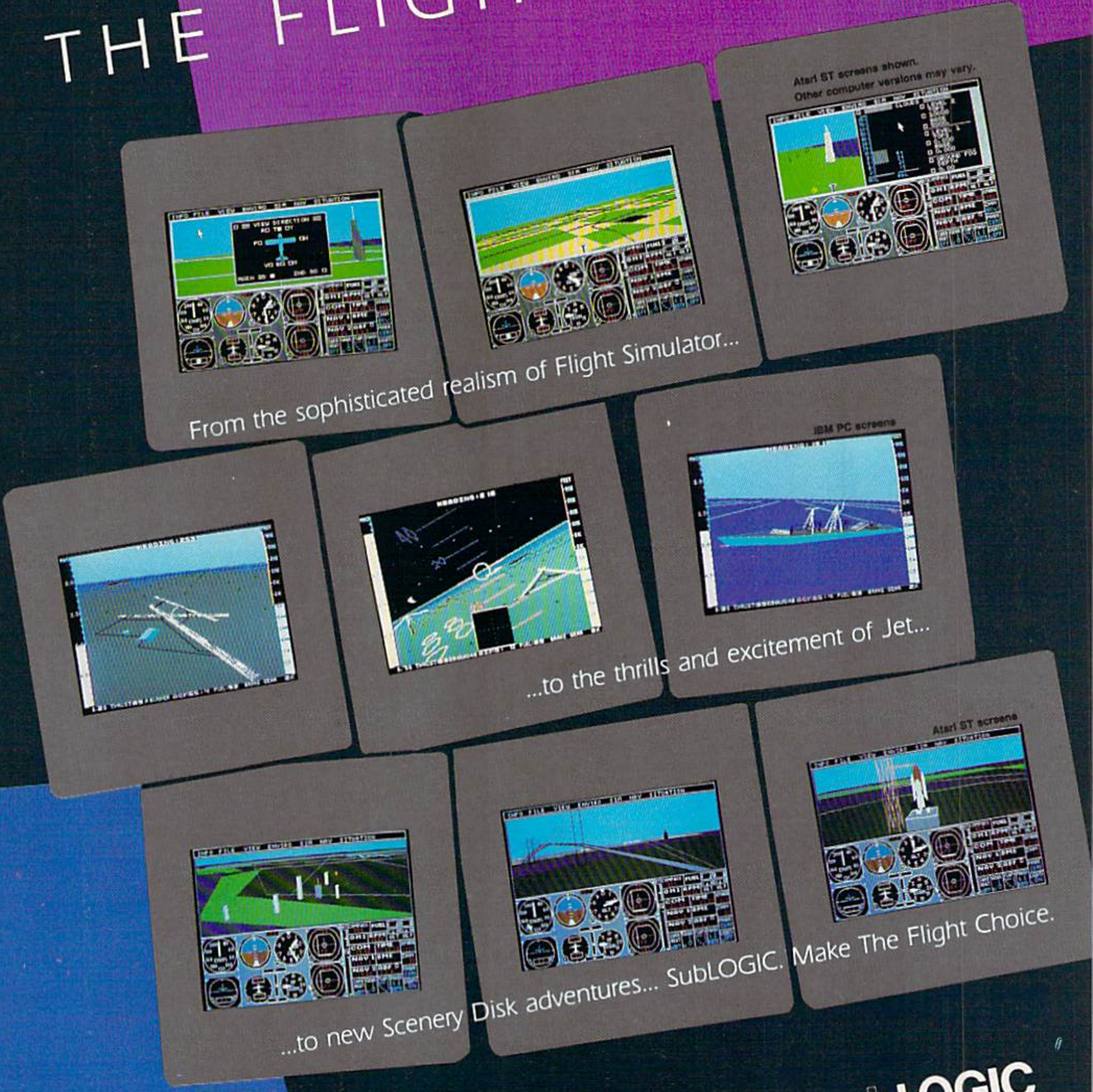

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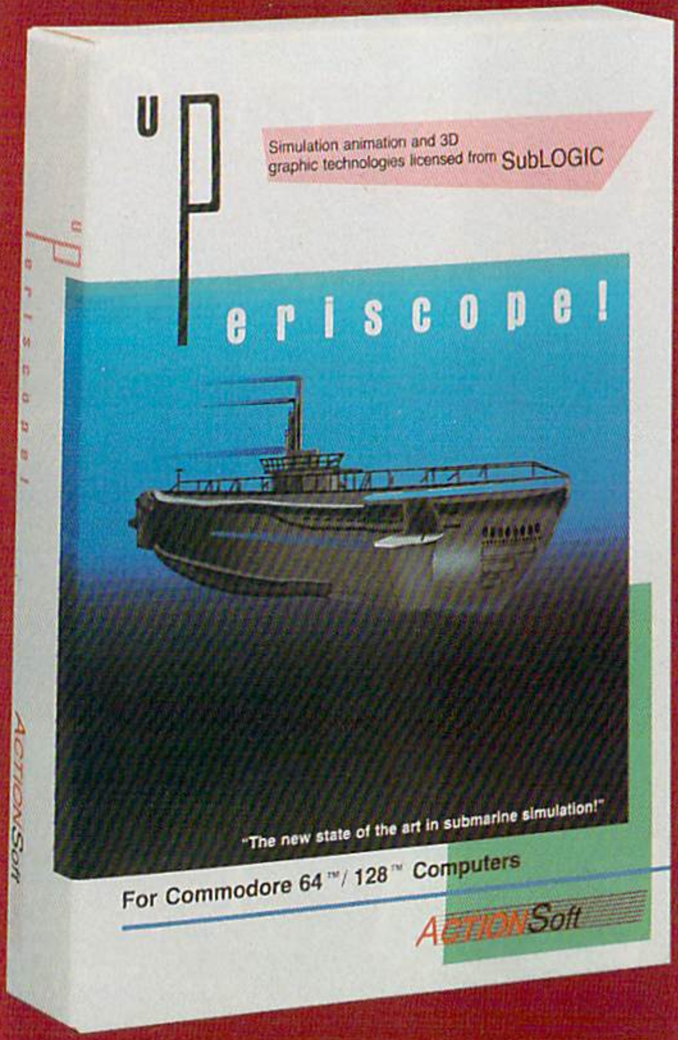
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Circle 188 on Reader Service card

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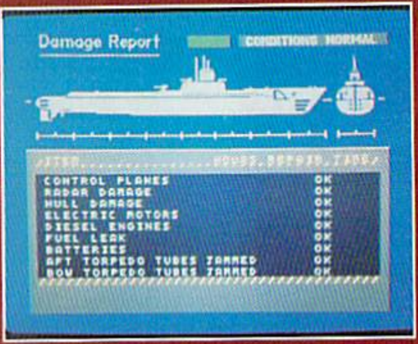
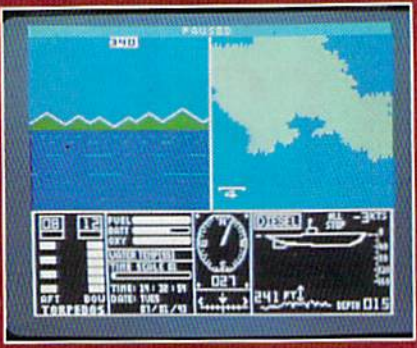


Damage Report CONDITIONS NORMAL

CONTROL PLANES OK
RADAR DAMAGE OK
HULL DAMAGE OK
ELECTRIC MOTORS OK
DIESEL ENGINES OK
FUEL LEAK OK
BATTERIES OK
AFT TORPEDO TUBES JAMMED OK
BOW TORPEDO TUBES JAMMED OK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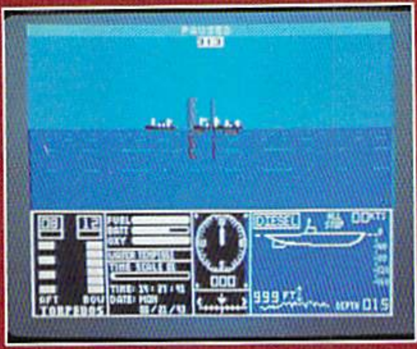
FUEL
BATT
OXY
DIESEL
TORPEDOS
241 FT
DEPTH 015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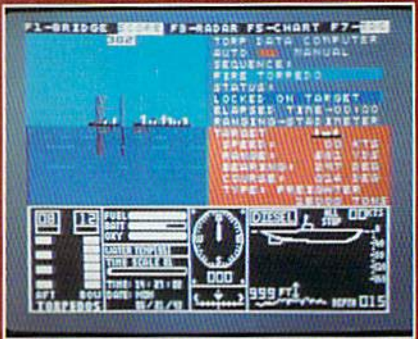
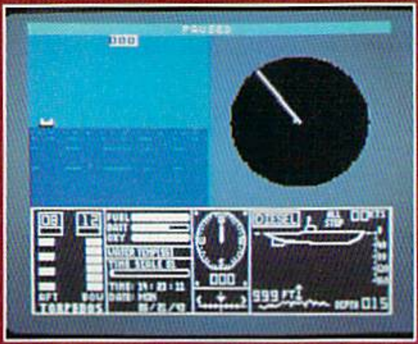

F1-BRIDGE F3-RADAR F5-CHART F7-
TORP DATA COMPUTER
AUTO MANUAL
SEQUENCE:
FIRE TORPEDO
STATUS:
LOCKED ON TARGET
TARGET
TYPE: FREIGHTER
DIESEL
TORPEDOS
999 FT
DEPTH 015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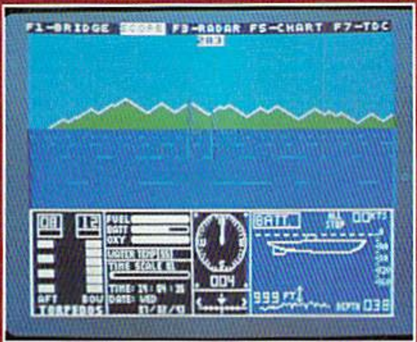
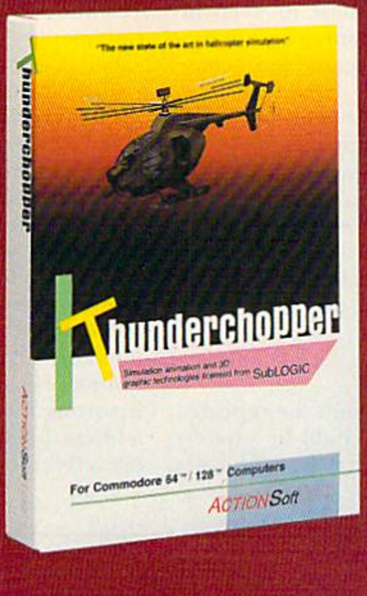
DEPTH 015


F1-BRIDGE F3-RADAR F5-CHART F7-TDC
BATT
TORPEDOS
999 FT
DEPTH 038

ThunderChopper

And don't forget ThunderChopper! For true helicopter action and realism, nothing else even comes close. ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun.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For Commodore 64™/128™ Computers
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Circle 188 on Reader Service card.

Database Decision

Hear ye, hear ye, keepers of data and collectors of info:

let a database program make your life easier.

By TIM WALSH

* * *

DRIVEN BY A FLURRY of consumer interest, an increasing number of Commodore users are turning to database programs to help organize their records. Many reasons exist for both homeowners and small-businesspersons to consider using databases for keeping their affairs in order. For a homeowner, no better method exists for maintaining lists of names and addresses, an inventory of personal possessions or an ongoing record of income and expenses. As a businessperson, you could use a database to keep inventories, create paperless customer and supplier lists and, once again, maintain income and expense records.

Since listing all the possible uses of your Commodore and a database program exceeds the scope of this article, I'll just describe how databases work and then survey some of the commercial programs that have become popular with Commodore users. Whether you're a database neophyte or an old pro at dancing the database shuffle, you're certain to pick up some worthwhile information.

THE DATABASICS

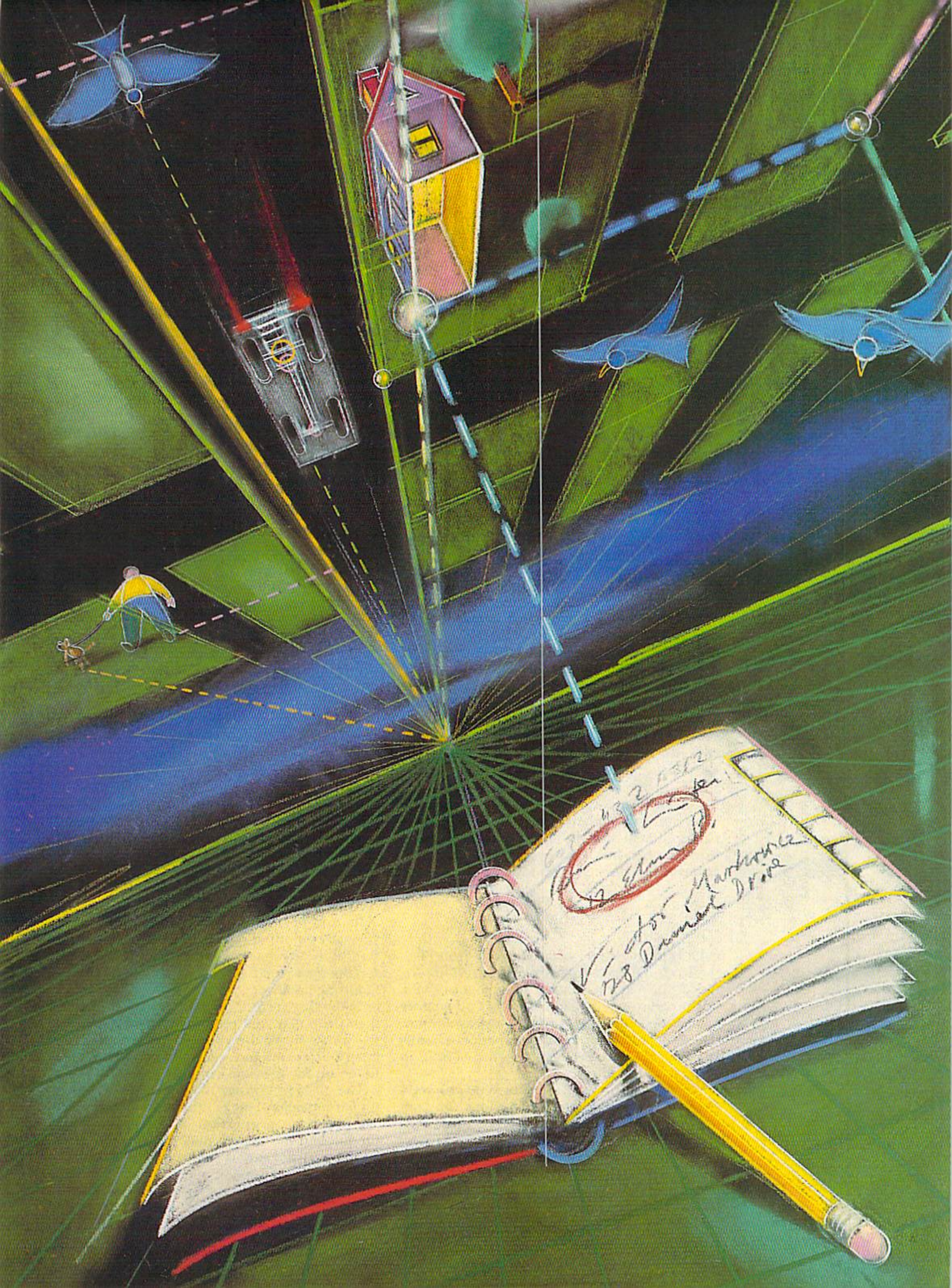
While any program that permits the repeated entering and storing of data could be broadly defined as a database, a true database must meet certain criteria. First of all, the program must allow you to form a structure, or layout, that organizes the storage and display of your data. As the user, you design the layout to your liking. A name-and-address database's structure might appear as:

Name:
Street or PO Box:
City, State, Zip Code:
Telephone:
Comments:

Next, the data is classified into elements called fields, records and files. Using the above structure as an example, name, street, city, state, zip code, telephone number and comments could all be separate *fields*. The field is the lowest denominator for the data. All the fields listed under one person would constitute a *record*, and all the records a *file*. Finally, most databases used on Commodores possess a relational design, which means that all the fields within a record are mutually related in some way.

One primary function that databases provide is sorting by fields. For instance, if you had an address book database, you could include an extra field containing R for relative, F for friend ►

ILLUSTRATED BY ANDRZEJ DUDZINSKI


Victor Markowicz
728 Diamond Drive

"Both the C-64 and C-128 versions operate fast and efficiently, even when memory is packed with hundreds of records."

and B for business. Then, when sending invitations to a family reunion, you could sort and print a list of all the Rs. At holiday time, you could sort out both Rs and Fs for sending cards. When it's time to pay bills, you could sort out the Bs and even use the database to print mailing labels.

Other database functions include defining key fields for specified input and rapid data searches, math manipulations, tabulations of field values and report printing. Moreover, nearly all the commercial databases for Commodores can share files with word processing, spreadsheet and other applications programs.

DATABASE POTPOURRI

In preparation for this article, I traipsed through a collection of popular C-64 and C-128 databases that the inexperienced but well-read user might consider purchasing on name recognition alone. The list includes Fleet Filer, Vizastar 128, Data Manager 128, Pocket Filer 2, Superbase 128 and The Consultant. Two of these, Data Manager 128 and The Consultant, use a disk-based relative-file format for maintaining records. Database designers long ago discovered that rapid storing, retrieving and sorting of database files work best with relative files.

Unfortunately, relative files treat Commodore disk drives unkindly. Because the program accesses the disk for each file read and write, both the 1541 and 1571 become dangerously hot during these operations, and such abuse leads to rapid misalignment of the drive head, slipping belts and other mechanical maladies. However, salvation exists in the new Commodore 1581 3½-inch disk drive. As *RUN*'s Lou Wallace explains elsewhere in this issue, the 1581 represents a significant hardware improvement, and nowhere is this more apparent than in Commodore databases utilizing relative files. Despite time constraints that limited the testing process, the 1581 worked well when used as primary device 8 or as secondary device 9 with work disks.

Fleet Filer

I'll start the survey with a look at Fleet Filer, the latest database from Professional Software, Inc. (PSI). While hardly the most sophisticated, this program is popular with many Commodore owners because it's easy to use—so easy, in fact, that those with prior database experience hardly need the 39-page user's manual. Just boot it up and go!

When you purchase the program, you get a single-sided disk containing versions for both the C-64 and the C-128 80-Column mode. (Purchasers of PSI's Fleet System 2+ find that Fleet Filer is included with that program.)

A main menu that lists ten primary options makes Fleet Filer completely menu-driven. The program's functions include field searches, calculations and sorts, mailing label printing and report generation. Enough error-trapping exists in the program to minimize crashes, no matter how erroneous your input.

When in use, Fleet Filer's files reside in memory—not a common program design in these days of disk-resident files. However, both the C-64 and C-128 versions operate fast and efficiently, even when memory is packed with hundreds of records.

My main criticisms of this program are its lack of a command for jumping to a specific record and the fact that you can't advance beyond the last record directly to the first. However, its clean, simple design and ease of use makes Fleet Filer a wise choice for those who are lukewarm toward computers or too busy to learn to use a sophisticated database. You'll especially like Fleet Filer if you already use PSI's Fleet System word processor, because their files are compatible. *(Professional Software, Inc., 51 Fremont St., Needham, MA 02194; 617-444-5224; $39.95.)*

Vizastar 128

Progressive Peripherals' Vizastar 128, an 80-column spreadsheet/database combination (formerly marketed by Solid State Software), looks intimidating at first. Its lofty price tag, containerized packaging and thick, spiral-bound reference and accessory guides all denote complexity; yet the program's database is nearly as easy to use as Fleet Filer, and offers a respectable list of virtues.

Menu-driven by design and utilizing a full-screen format, Vizastar makes creating a database a simple process. You merely access a menu with the Commodore key, press D (for data), and then proceed either to design a new database or to recall one that was previously defined. Unlike Fleet Filer, Vizastar keeps its files disk-based, with the database layout saved in one sequential file and the data in a second. Every record you write is instantly sorted according to a user-selected key field, then saved to disk before you access the next record.

Its ease of use becomes apparent as soon as you start inputting records. If you want to enter several records that share the same fields except for the first (such as various members of one family or employees of one firm), you need enter only the first record, press F1 to save it to disk, then press A to add the next. Unless you press F2, which clears the previous record, you can enter a new name and retain all the field contents found on the previous record.

The speed of Vizastar 128 is so impressive that it's hard to believe the C-128 is an 8-bit machine. The program also offers true 80-column graphics for pie and bar charts, plus multiple windows and import and export commands for file transfers with a word processor.

I think that Vizastar's greatest drawback is its documentation, which contains a liberal helping of coined words and seemingly random capitalization for emphasis. Peppering sentences with uppercase words makes for cluttered text that's difficult to read. However, the documentation's tutorial guide offers all the help you need for setting up your first database.

Since the Vizastar database is an accessory to the Vizastar spreadsheet, and not vice-versa, it isn't as fully equipped as some other C-128 databases. While sorting, entering formulas and isolating specified fields are possible, the program's main strengths lie in the functions performed from the spreadsheet. I would not recommend Vizastar 128 for its database alone, but I do recommend it as a spreadsheet and urge spreadsheet users to employ the database as well. *(Progressive Peripherals and Software, 464 Kalamath St., Denver, CO 80204; 303-825-4144; $89.95.)*

Data Manager 128

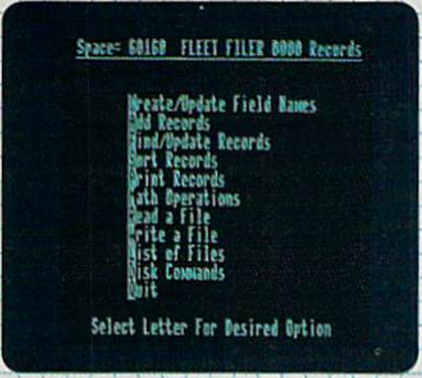
Data Manager 128, another C-128, 80-column database, makes extensive use of drop-down menus for quick access to options and modes. Printed reports, on-screen graphics, statistical calculations, specific field data searches (X-searches) and nonnumeric field sorts are all easy to do with this screen-formatted program.

The accompanying 126-page user's guide includes a step-by-step tutorial that does a good job except for one significant shortcoming—it assumes you won't make any mistakes entering the data. Because of this oversight, my experience with the tutorial became a bit of an ordeal. The tutorial lets you create a sophisticated seven-day relational database, with columns and rows to keep track of daily expenses. I started by leaving Sunday out, then deciding halfway through the tutorial that I needed it after all. No problem, I thought; I'll just insert a Sunday field and make any necessary adjustments. Wrong. After a while, I realized that because the program assigns a number to each field, by adding Sunday I threw most of the calculation instructions out of sync when it came time to enter field numbers into formulas to tally up expenses. I eventually erased the entire format and started over from scratch.

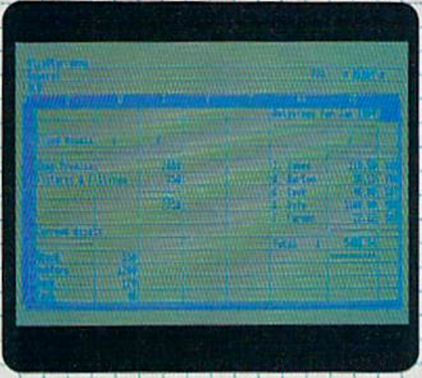
There is also a flaw in Data Manager 128's procedure for modifying existing fields. You start by pressing the escape key to access the Create menu. Then you select the Modify option, press return and move to the field you want to modify. So far, so good. However, the manual fails to mention a potentially disastrous pitfall: If you press escape to abort the operation at this point, you'll temporarily corrupt the field.

While I'm on the subject of errors, here are a few pointers on correcting them with Data Manager 128. To remove a field you've entered in the wrong screen location, first press the escape key to access the Create menu, then select the Delete Field option, move the cursor to the field in question and press return. When you answer Y to the prompt, the offending field disappears. To return to the Create menu, press escape again.

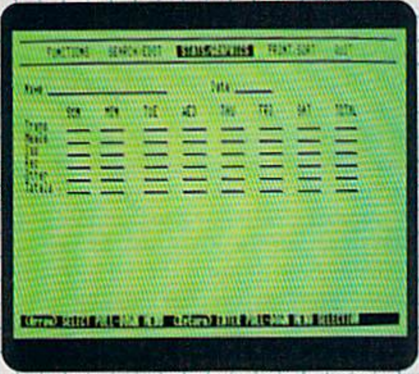
Aside from the problems I've mentioned, I find Data Manager 128 a superb program. Its field calculations are easily implemented, and it's fun to use. I recommend it to those with some database experience and a yearning for small adventures. Thanks to this program, anyone can ►



Fleet Filer 128.
Main menu display.



Vizastar 128.
Spreadsheet
and database demo.



Data Manager 128.
View of database
worksheet.

own an impressive expense-account tabulator. *(Timeworks, 444 Lake Cook Rd., Deerfield, IL 60015; 312-948-9200; $69.95.)*

"While I first interpreted the mouse option as little more than a gimmick, I found that it speeds up editing significantly."

Pocket Filer 2

Many Commodore users are already familiar with the Pocket Series of software from Digital Solutions. Lately this software, including the Pocket Filer database, has been upgraded. If you're a registered owner of Pocket Filer 64 or 128, you can purchase Pocket Filer 2 for $19.95. The disk includes a C-64 version and a C-128 version, plus a sample sequential datafile to help you establish your own database.

The 96-page Pocket Filer 2 manual is well organized and thorough. I particularly commend its highlighted references to the C-128 version, to distinguish them from C-64 features. However, it lacks the complete step-by-step tutorials offered by some of the other database manuals. For that reason, it took me nearly twice as long as usual to master Pocket Filer 2.

Once I'd cleared that hurdle, I found that Pocket Filer 2 contains as many interesting and useful options as any other Commodore-specific database. I particularly liked its compatibility with the Superbase, Consultant (see below) and Data Manager file formats. Other features abound, ranging from activation of the numeric keypad and other C-128 keys in 64 mode to support of the Commodore 1351 proportional mouse and the Commodore 1700 and 1750 RAM expanders as RAM disks. The program also displays a help screen when you press the help key on the C-128, or F7 on the C-64.

Although I have difficulty envisioning a practical database application requiring more than a hundred fields or so, Pocket Filer 2 lets you enter up to 255 fields per record, containing a maximum of 2000 characters. It also permits physical sorts on its files. Up to nine fields can be sorted by either a high-speed method that sacrifices some accuracy or a more accurate, low-speed sort. Maybe the test files I created weren't large enough, but the high-speed method sorted perfectly for me, and the low-speed sort worked as quickly as any database sort I've encountered.

When the 1700 and 1750 RAM expanders are configured as RAM disks (assigned a device number of 2), they provide over 500 and 2000 blocks of storage, respectively, enabling you to save and copy database files almost instantaneously. No fancy numbers, codes or programming skills are needed to set up the RAM-disk feature.

The same ease of use is shared by Pocket Filer 2's 1351 mouse driver. By plugging the mouse into joystick port 1, you activate special routines in Pocket Filer 2 for defining layouts and report formats, accessing the disk drives and performing a variety of other tasks. While I first interpreted the mouse option as little more than a gimmick, I found that it speeds up editing significantly.

Pocket Filer 2 also seems to work properly with the new 1581 3½-inch disk drive, assigned as a device 9 work drive.

Because this program lacks an in-depth tutorial, you'll need a little experience to get started with it. Aside from that, it's easy to use, and any C-64 or C-128 user with a need for a database would probably find it delightful. *(Digital Solutions, 2-30 Wertheim Court, Richmond Hill, Ontario, Canada L4B 1B9; 416-731-8775; $59.95.)*

Superbase 128

In addition to Vizastar, its spreadsheet/database combination, Progressive Peripherals also distributes the time-honored Superbase, a database available in both C-64 and C-128 versions. I examined the 128 version for this article.

Having read plenty of user's group reports that devote entire columns to Superbase experiences, and having spoken with individuals who flew into a frenzy at the mere mention of its name, I expected difficulty in attaining proficiency with the program. However, I found it no more complicated to master than any other database I tested for this article.

Superbase 128 comes with over 200 pages of well-written documentation to escort you through the creation of sample databases. As you use the program, you can access full-page help screens that display anything you might need to know about performing a particular procedure.

Superbase 128 operates in a flexible full-screen format, and once you've designed a layout, all functions are accessed from two main menus. As you enter data into fields, you must specify the type, including key (for search purposes), text, date, numeric and result. Impressive calculating power lies in Superbase's Report-Writer option, and it resides in memory simultaneously with the Superscript word processor, so the two programs can readily exchange data.

Superbase 128 writes one program file and nearly fifty sequential files while creating a data disk. Because of this large number of files, I'd suggest that you not try to squeeze it onto a disk that already contains other files.

Like most programmable databases, Superbase 128 lets you write executable programs. To use the Program Writer utility, you press one key and then begin entering program text into the editor. A minimal knowledge of programming is required, since Superbase 128 uses a cross between Basic and a pseudo-code. A simple Superbase 128 program that does absolutely nothing except scan backwards through a file might appear like this:

```
100 select the last record
200 store the record
300 end of menu
400 goto 100
```

While the programming language is simple, it doesn't limit you to simple operations. You can use it to rapidly program the printer and access the disk drive, as well as to perform various numeric calculations and conversions. The 128 version also allows the input of Basic 7.0 keywords, such as Do-While loops, If-Then-Else and even Tron and Troff commands.

Like an interesting work of art, Superbase 128 is intriguing. Occasionally I found myself anxious to finish filling in sections of the database to see if my latest calculation fields would execute properly. Which brings up another point: When you design a report and discover that one field or another doesn't perform calculations exactly as required, it's easy to find the bugs and fix them, even if you're a novice.

On the negative side, Superbase 128 is a disk-intensive program, writing each file to disk as soon as it's entered. This heavy disk activity, coupled with a heavily copy-protected master disk, made the 1541 I used get hot after several hours of use and begin to atrophy when reading files. A 1581 drive is almost a must for serious users of this program.

In essence, Superbase 128 is a wise investment for small-business owners. One thing is certain: If you buy this program, your small business will outgrow the memory and speed of your C-128 long before it outgrows the calculation and programming capabilities of your database. *(Progressive Peripherals and Software, 464 Kalamath St., Denver, CO 80204; 303-825-4144; $99.95.)*

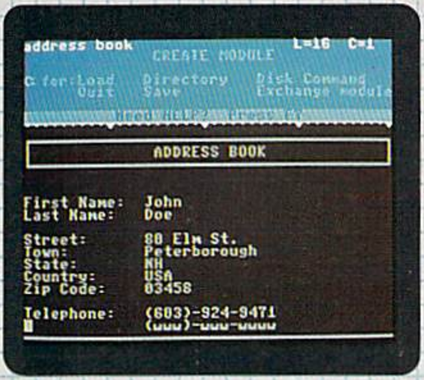
The Consultant

The Consultant, originally developed by Batteries Included, but now marketed by Electronics Arts, has led a colorful existence from its inception to the present. Having lived on the market for a number of years in various guises for the Commodore 8032, 4032 and PET 2001 computers, along with the C-64 and C-128, it has endured the test of time.

The packaging and disk I received contained a label and literature proclaiming how the program has been improved for the C-128. However, a major stumbling block immediately surfaced: the infamous Batteries Included dongle, or joystick key. A key for the C-64 came with the copy of the program I tested, and, while it fitted the joystick port on the C-128D, it wouldn't fit into the standard C-128. A spokesman for Electronics Arts has assured me that a C-128 version does exist. So, take my advice and specify the C-128 or C-64 version when you order The Consultant.

A number of features keep The Consultant a favorite among Commodore database users. First, it's easy to use, starting with the large, 186-page guide that leads you slowly through the learning process. The first tutorial, in which you set up a database for kids selling cookies, may seem frustratingly slow. However, I'd suggest that you see it through, because you'll need the fundamentals later.

Another reason for The Consultant's popularity is its forgiveness of fumbling fingers. Like Superbase 128, you must assign field attributes (key, alpha or numeric) when designing record formats with this program. Otherwise, it doesn't care what order your fields are in, what order they were originally in, what changes you make to the record format or when you make those ►

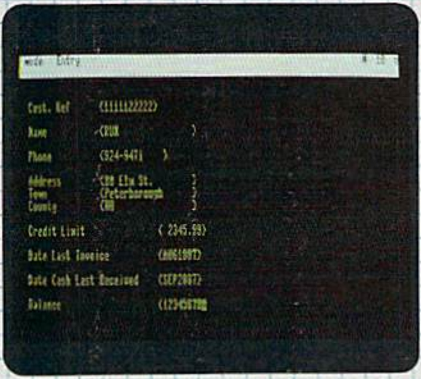


```
First Name:   John
Last Name:    Doe
Street:       80 Elm St.
Town:         Peterborough
State:        NH
Country:      USA
Zip Code:     03458
Telephone:    (603)-924-9471
              (uuu)-uuu-uuuu
```

Pocket Filer 2.

Displaying the

128 version.

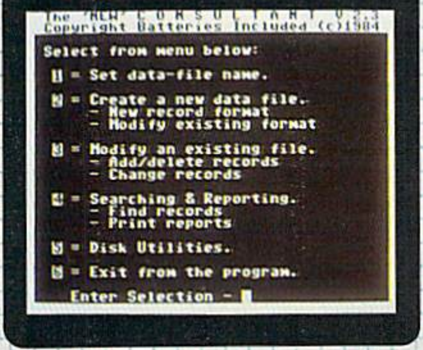


```
Cust. Ref     (1111122222)
Name          (CRUN          )
Phone         (924-9471  )
Address       (80 Elm St.        )
Town          (Peterborough      )
County        (NH                )
Credit Limit             ( 2345.99)
Date Last Invoice        ([illegible])
Date Cash Last Received  ([illegible])
Balance                  ([illegible])
```

Superbase 128.

Demonstrating

its versatility.



```
The 'NEW' C O N S U L T A N T V2.3
Copyright Batteries Included (c)1984
Select from menu below:
 1 = Set data-file name.
 2 = Create a new data file.
     - New record format
     - Modify existing format
 3 = Modify an existing file.
     - Add/delete records
     - Change records
 4 = Searching & Reporting.
     - Find records
     - Print reports
 5 = Disk Utilities.
 6 = Exit from the program.
   Enter Selection -
```

The Consultant.

The C-64 version's

main menu.

changes. Such versatility is not without its price, though. Large, memory-robbing arrays for storing fields become necessary, so The Consultant files are disk-based, not memory-resident.

The Consultant saves your records to two files on disk. One stores the record format; the second, a relative file, contains the data. The manual also provides an explanation of the three-step procedure for writing records to disk as sequential files, so they can be read into your favorite word processor. These files are compatible with PaperClip 64/128 and PaperClip II, two of Batteries Included's (Electronic Arts') word processors. If your word processor can read PaperClip files, then it can cer- ►

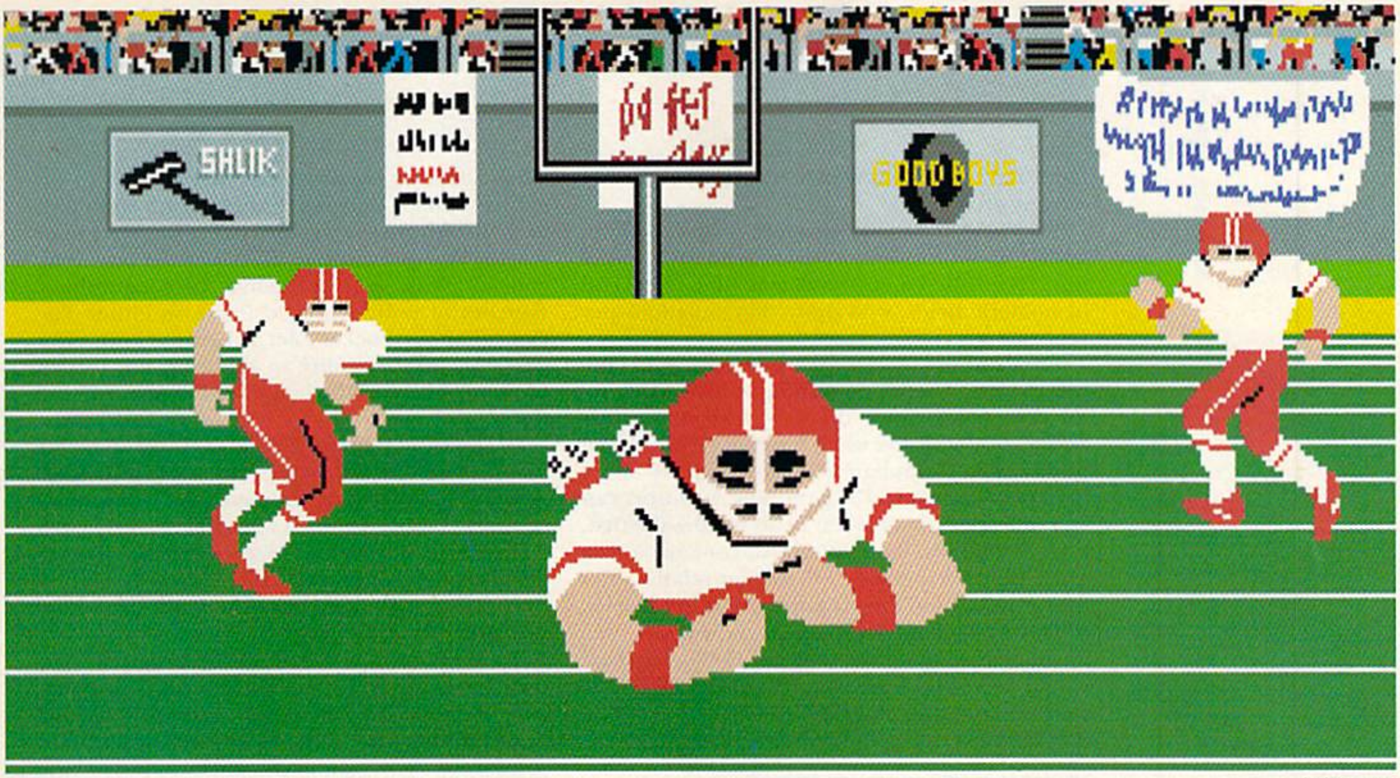
Data Manager 128
VIZASTAR 128
The Consultant
Superbase
Fleet Filer

Table 1. Major features of the databases reviewed.

	Fleet Filer	Vizastar	Data Manager 128	Pocket Filer	Superbase 128	The Consultant
64 & 128 versions	Yes[1]	Yes	Yes	Yes[1]	Yes	Yes
Sequential datafiles	Yes	Yes	No	Yes	Yes	Yes
Relative datafiles	No	No	Yes	No	No	Yes
Data security	No	No	Yes[2]	Yes	Yes	Yes
Number of field sorts	22	n/a[3]	10	n/a[4]	25[5]	3030[6]
Report generator	Yes	No[7]	Yes	Yes	Yes	Yes
Number of text characters per field	255	120	255	160	255	255
Number of fields per record	22	64	100	255	127	99
Major fields						
Alpha/text	Yes	Yes	Yes	Yes	Yes	Yes
Date	No	Yes	Yes	Yes	Yes	No
Key	No	Yes	No	No	Yes	Yes
Numeric	Yes	Yes	Yes	Yes	Yes	Yes
Formula/math	Yes	Yes	Yes	Yes[8]	Yes	Yes

Notes:

1. Included on same disk.
2. Password for datafiles.
3. Sorts by cells within spreadsheet.
4. Not specified in documentation, but offers both low-speed and high-speed sorts.
5. Depth of ten characters per field.
6. Using Supersort at ten-character depth.
7. Prints database contents only.
8. Uses math files to put calculated results into fields.



Amiga screen

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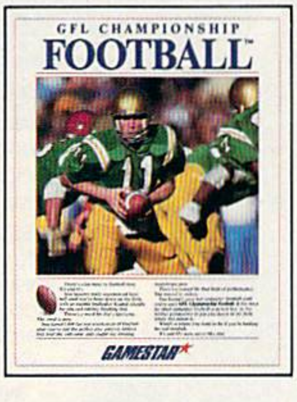

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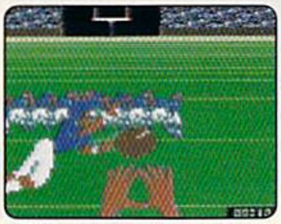
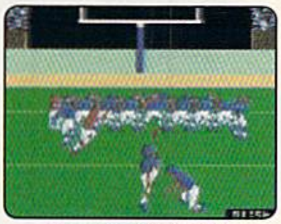
Amiga screen



Commodore 64-128 screen

Commodore 64-128 screen



Commodore 64-128 screen

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tainly read The Consultant's sequential files without any problem.

The Consultant performs four math functions: addition, subtraction, division and multiplication. It can also handle field tabulation at the end of numeric fields, with up to 36 tabulations per report.

The Consultant offers graduate courses in multilevel sorts. There's no waiting when sorting individual fields, since the key field in a file is automatically sorted when it's entered and saved to disk. The Consultant also sorts initially into a field depth of up to 15 characters. A subsort can be performed on up to ten fields besides the first, and, as a bonus, the master disk contains a program called Supersort, for sorting relative files that grow beyond the program's built-in capacity.

The Consultant lives on as a program that anyone looking for a C-64 or C-128 database would be wise to consider. *(Electronics Arts, 1820 Gateway Drive, San Mateo, CA 94404; 415-571-7171; $59.95.)*

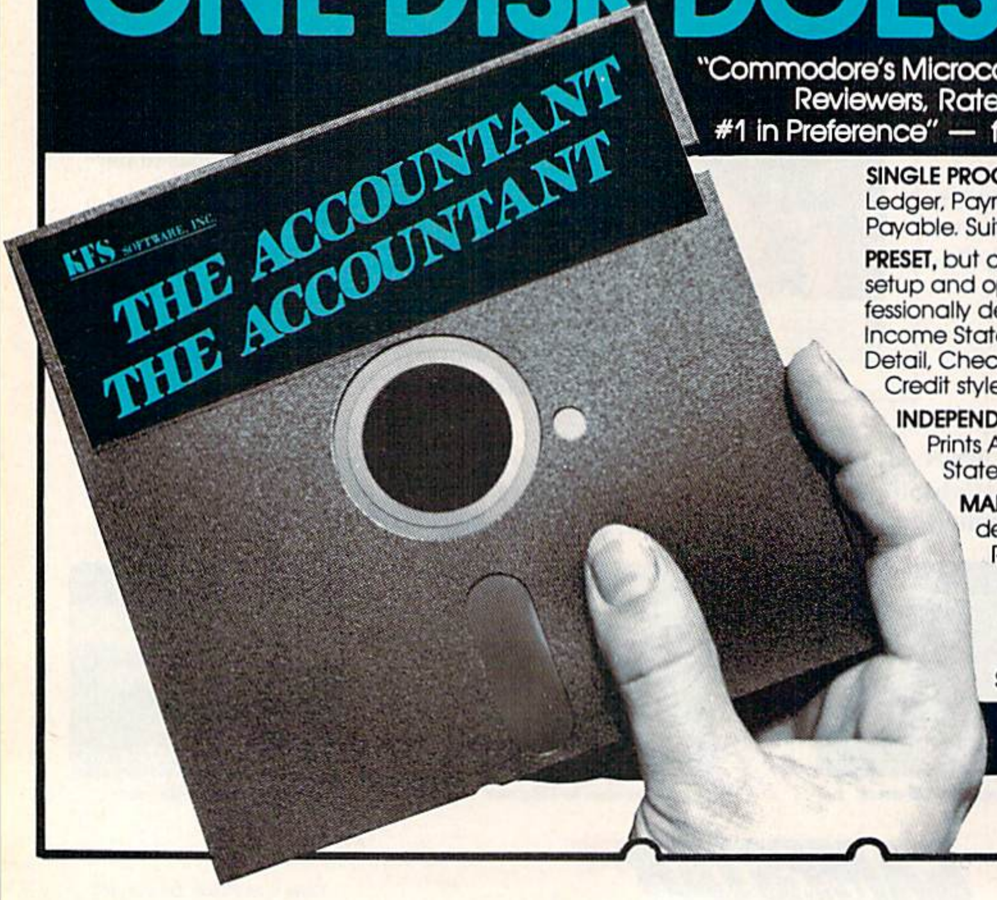
WHERE TO BASE YOUR CHOICE

If asked to choose which database I would plunk down my hard-earned cash for, I'd say it would depend on my needs. If I wanted to organize names, addresses and phone numbers, and possibly my video tape collection, Fleet Filer would be appropriate. If I were researching collections of famous sayings or biographical sketches of politicians, I'd insist on either The Consultant or Pocket Filer 2, because both offer unparalleled flexibility in tailoring the format of the database to the length of the words in the fields.

I'd choose Superbase 128 with its programmable modular design if I needed to work with large amounts of fluctuating data, such as the inventory of a small business, but I'd want Data Manager 128 if I needed to bill clients. Since Vizastar holds the title as the best commercial spreadsheet you'll find for the 128, that alone makes it worth the admission price, database or not.

The bottom line is that all the programs covered here are well designed, function properly and, in most cases, will let you accomplish virtual miracles with your data. As with any application software, analyze your needs and buy the database that fulfills them best. ■

Tim Walsh is RUN*'s technical editor.*



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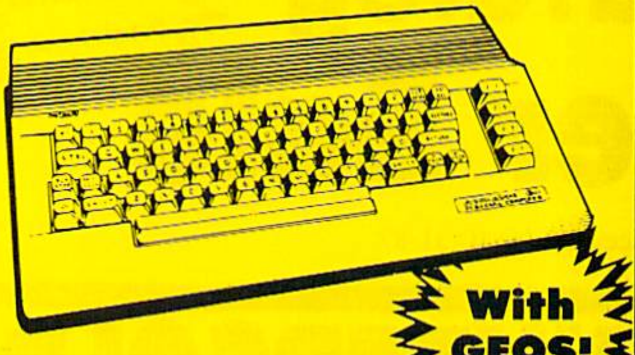

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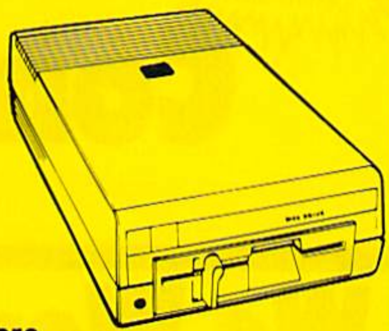

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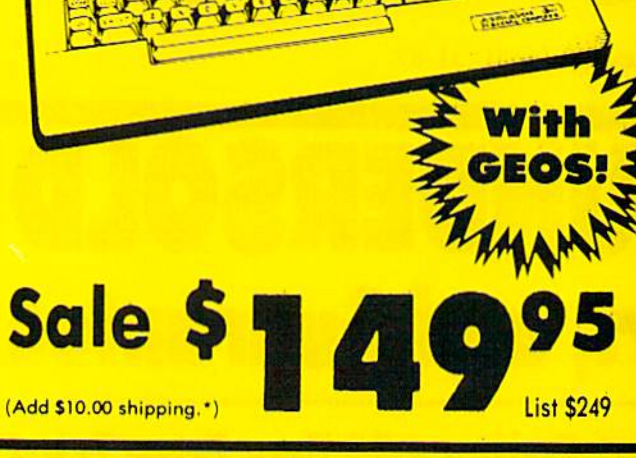

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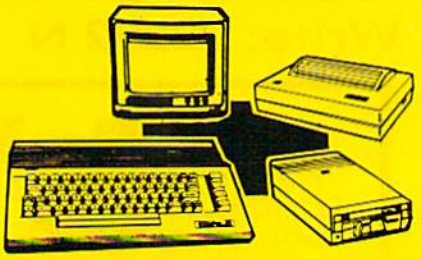

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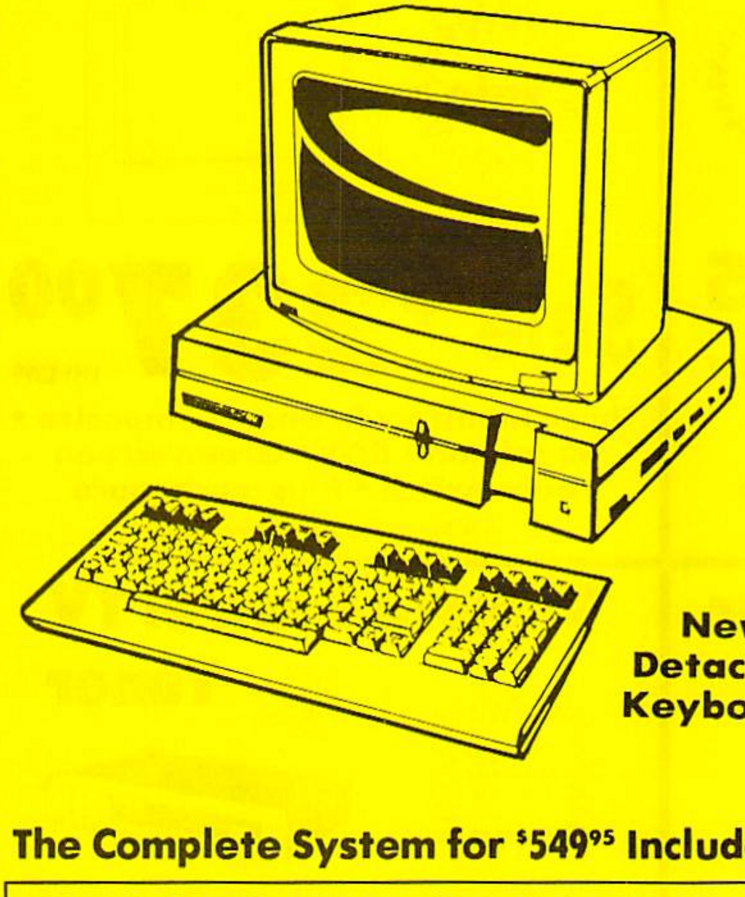

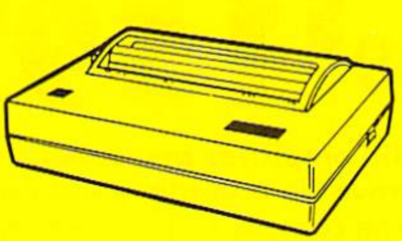

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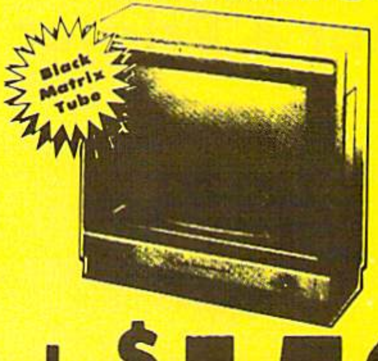

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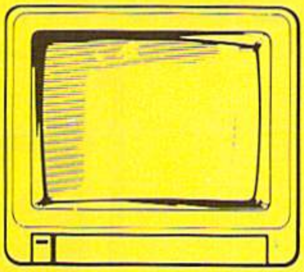

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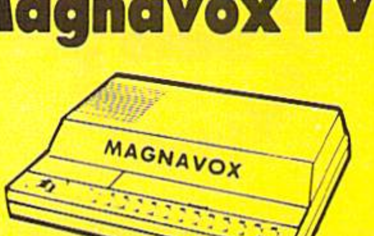

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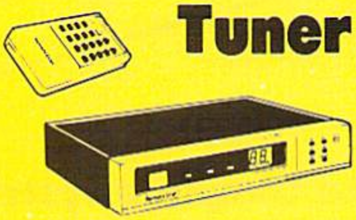

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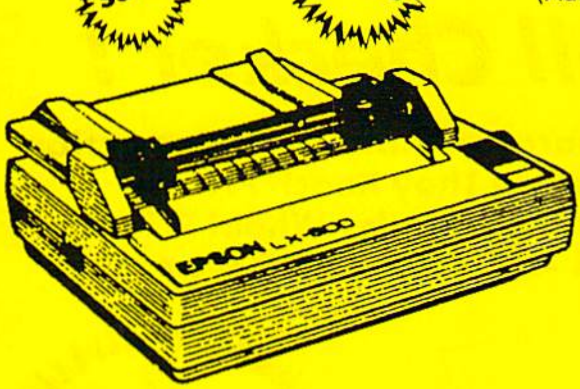

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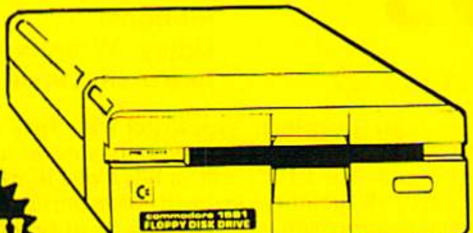

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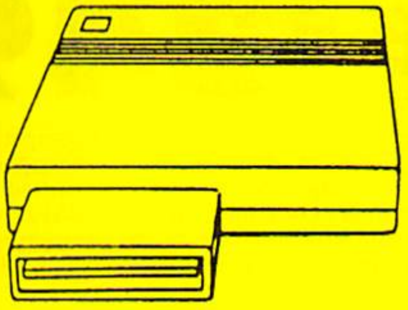

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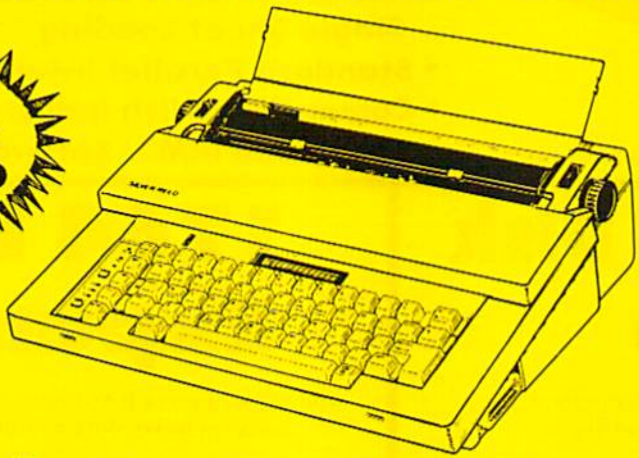

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Correcting tapes	Lift-off and cover-up
Line space lever	0,1,1-½,and 2
Keyboard selector	I and II
Print pitch	10,12, and 15

KEYBOARD:	
Keys/characters	44/96
Automatic carrier return	
Automatic correction	25 ch.
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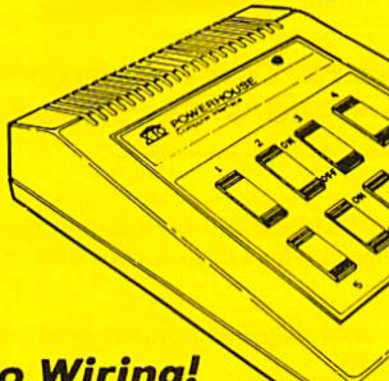

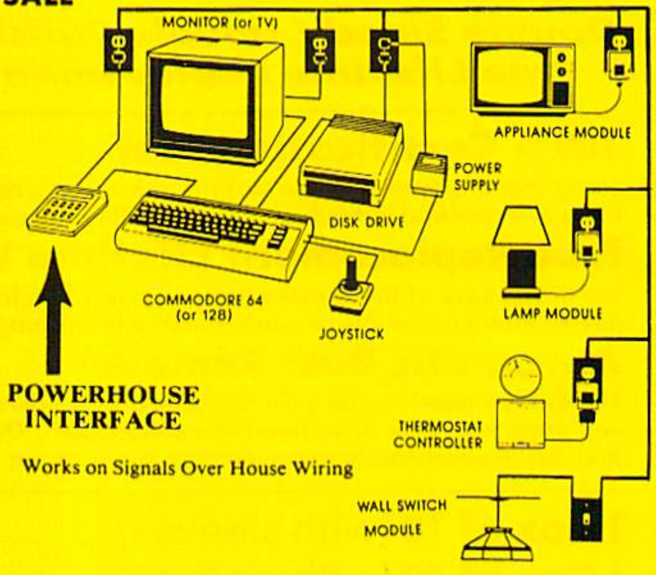

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2 Pin Appliance Module - up to 500 watts	$19.95	**$14.95**
3 Pin Appliance Module - up to 500 watts	$19.95	**$14.95**

Many types of modules are available including appliance modules for TVs, stereos, coffee pots, etc. Lamp modules which contain a dimmer and can be used for incandescent lamps up to 300 watts. Wall switch modules which also contain a dimmer and can be used for incandescent outside lights and ceiling lights of up to 500 watts. 222V heavy duty appliance modules for 220V air conditioners and water heaters. The thermostat controller for central heating and air conditioning. The 3 way wall switch for controlling incandescent lights operated by two switches. The heavy duty wall receptacle module to replace your existing wall receptacle, ect.

Plus, works with BSR, GE, Leviton, Radio Shack, and Sears Roebuck modules (all 256 codes addressable).

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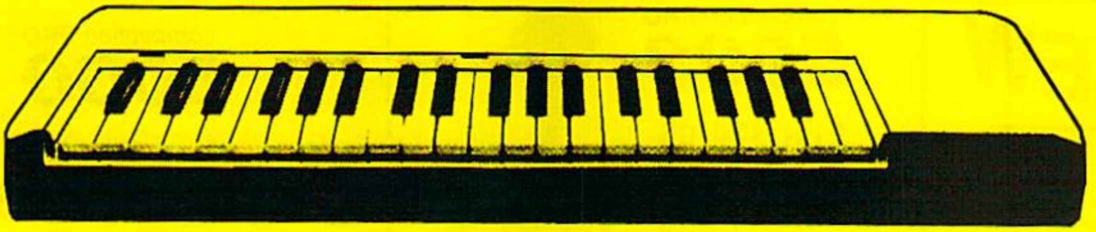
Full Size Piano/Organ Keyboard

SALE



SALE

On Sale For Only $\$49^{95}$*

List $159

Keyboard — 40 Keys (A-C) guage spring loaded to give the feel and response of a professional polyphonic keyboard instrument. Plugs right into the joystick port of the Commodore 64 or 128. This sturdy instrument comes with carrying handle, protective key cover and built-in music stand. Size: 29'' x 9½'' x 4'' Weight: 9 lbs.
Registers (with the Conductor Software) — Organ • Trumpet • Flute • Harpsicord • Violin • Cello • Bass • Banjo • Mandolin • Callipoe • Concertino • Bagpipe • Synthesizer 1 & 2 • Clavier 1 & 2 • Can be played over a 7 octave range • Programmable sounds
Recording (with the Conductor Software) — Three track sequencer plus over-dubbing with multiple instruments playing at the same time.
*** Conductor Software Required** (Add $10.00 shipping.*)

The Conductor Software

List $29.95 **Sale $19.95**

The Conductor Software teaches how a compostition is put together, note by note, instrument by instrument. You will learn to play 35 songs from Bach to Rock. Then you will be ready to compose your own songs!

Teaches — Scales • Bass lines • Popular songs from ''Jingle Bells'', ''Bach Minuet'', and Ravel's ''Bolero'' to Michael Jackson's ''Thriller''.
Features — Sound envelope control with attack, delay, sustain and release times • Records as you play • Playback tracks while you record • Stores songs on disk • Much more
Requires — Above Keyboard • Commodore 64 or 128 with disk drive (Add $3.00 shipping.*)

The Music Teacher

List $39.95 **Sale $24.95**

This Program teaches a beginner how to read music and play it correctly in rhythm on the keyboard. Features trumpet, organ, violin, synthesizer instrument sounds, built-in metronome, pause-play control and set-up menu for cusomizing the music teacher. (Disk) List $39.95 **Sale $24.95** (Add $3.00 shipping.*)

The Printed Song

List $29.95 **Sale $19.95**

With this program you can print out, in music notation, your compostition for others to read or play. Requires The Conductor Program and printer compatible with the Commodore graphics mode such most dot matrix printers with a Commodore graphics interface. (Disk) List $29.95 **Sale $19.95** (Add $3.00 shipping.*)

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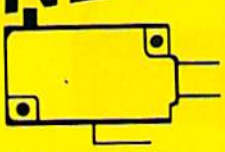
NEW



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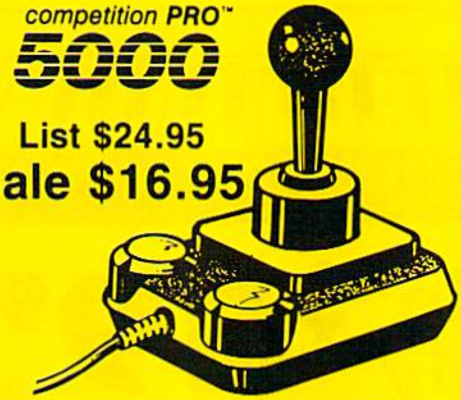
5 Year Warranty

Rated No. 1

competition PRO™ **5000**

List $24.95

Sale $16.95



for Atari® 5200

competition PRO™ **5000**

List $29.95

Sale $24.95

Allows Keypad Hook Up

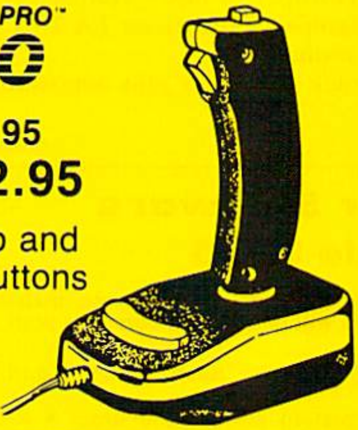
Flight Control Joystick for Atari® /Commodore®

competition PRO™ **3000**

List $19.95

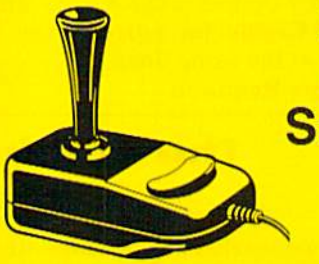
Sale $12.95

Trigger, Top and Base Fire Buttons



Economy Joystick for Atari® /Commodore®

competition PRO™ **1000**



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Single Fire Button

Spring Switches

Limited Quantities

All these quality *competition PRO*™ Joysticks feature:

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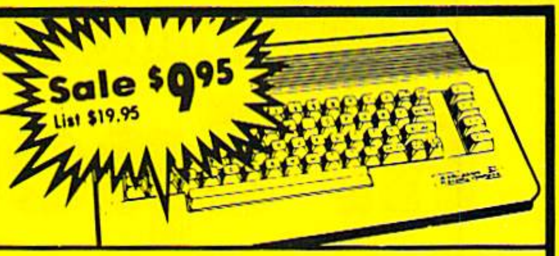
Clean your computer keyboard in a fast, efficient and safe manner. The keyboard cleaning solution is exclusively formulated to remove skin oils, dust and dirt that can destroy your equipment. The non-residue solution with anti-static properties will not build up like ordinary household cleaners, so clean as much as you like without worry. Plus the lint free, high absorbency, non-abrasive cloths will not scratch or mar your equipment. (Shipping same as software.*) List $19.95 **Sale $9.95**



Sale $9.95
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Disk Drive Cleaner

- *60% of all drive downtime is the result of poorly maintained drives.*
- *Drives should be cleaned each week regardless of use due to sensitivity to smoke, dust and all micro particles.*
- *Regularly performed maintenance is the best way of ensuring error free use.*

This unique twin slot jacket design gives twice as many "wet-dry" cleanings per rotation as other leading brands. Non abrasive, 100% lint free, random fiber cleaners capture disk oxide build up, dust and smoke particles. This will insure you against disk and data loss from dirty disk drive heads. Just like you must clean your tape player, your must clean your disk drive. 24 cleanings per kit. (Shipping same as software.*) List $19.95 **Sale $9.95**

TV/Monitor Screen Restorer & Cleaning Kit

Reduce eye fatigue by increasing the clarity of your TV or monitor screen. This kit contains a hard wax formulation to cover surface imperfections on video screens. This restores optical clarity, making what you see more distinct. Plus the high absorbency cloths and anti static spray allow you to clean your screen on a regular basis to keep it looking better than new. This is highly recommended for people who view screens for extended lengths of time. (Shipping is same as software.*) List $19.95 **Sale $9.95**

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Buy each one for $9.95 or all three together for $19.85!

Get Organized With This Elegant Solid Oak Computer Desk And Printer Stand

Specifically designed for the home computer user, this table and stand will fit just about anywhere. The genuine oak, sealed and with a lacquer topcoat, is compatible with any decor. The metal to metal connections provide an easy and sturdy assemble with greater strength and durability.

Ready to Assemble

Sale

Ready to Assemble

Genuine Oak Desk

Sale $99.95

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Hi-Speed Printer

☆ 300 CPS Draft - 50 CPS NLQ ☆

with NLQ

Optional Color Printing Kit

List $199.95 **Sale $99.95**

with NLQ

Sale $359.00 List $599

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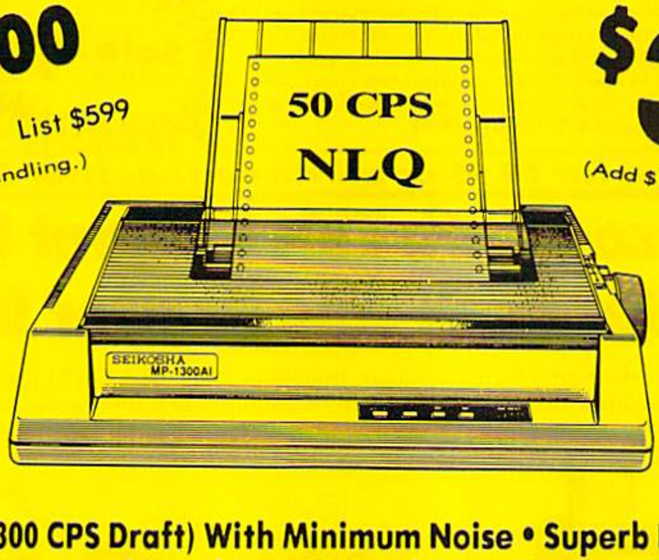

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(Add $10.00 shipping & handling.)

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Hi-Speed Printing (300 CPS Draft) With Minimum Noise • Superb Near Letter Quality • Variety of Characters and Graphics • IBM and Epson Modes • Built-in 10K Buffer • Built-in Parallel & Serial Interface Ports • Automatic Paper Loading and Ejection • Download Character Setting • Front Panel Margin Setting • Bottom Feed • Optional Easy Handling 7-Color Printing Kit On Sale For $99.95

Print Method
Impact Dot Matrix
Print Speed
Draft- 300 CPS NLQ- 50 CPS
Character Sets
185 Characters Kinds, 8 International Fonts, 256 Download Characters

Dimensions
18.5 (W) x 14.1 (D) x 5.5 (H) inch
Weight
Approx. 19 lbs
Printing Direction
Bi-directional
Ribbon (Life exp.)
Black: cassette (8 million characters)

Line Spacing
7/72", 1/8", 1/6", n/216", n/144", n/72"
Paper Feed
Adjustable tractor and friction feed
Replacement Ribbons

Black	Sale $14.95
4-Color	Sale $19.95

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Commodore Interface and Cable Included

With Near Letter Quality

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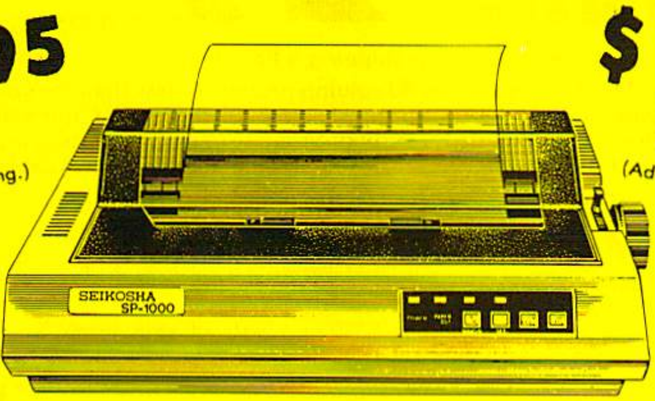
100 CPS Draft/20CPS Near Letter Quality • Dot Addressable Graphics • Adjustable Tractor and Friction Feed • Automatic Paper Loading • Underline • Right & Left Margin Settings • Pica, Elite, Condensed, Italics • Bold Print • Super & Subscript • Double Strike • Superb Near Letter Quality

$139.95

(Add $10.00 shipping & handling.)



$139.95

(Add $10.00 shipping & handling.)

Fantastic Graphics

2 Year Ltd. Warranty

Easy to Use

The Seikosha 1000 is one of the best values in the United States today. Print your letters, documents, programs, pictures, and more at a blazing 100 Characters Per Second or 20 cps in the Near Letter quality mode. (Looks just like it came from a typewriter.) Plus, choose your printing mode (NLQ, Draft) from your wordprocessor or by simply pushing the controls on the front panel. *Fantastic Quality at a Fantastic Price.*

Print Method
Serial impact dot matrix (9 pin)
Print Speed
Draft- 100 CPS NLQ- 20 CPS
Character Sets
96 ASCII Characters, Symbols (includes italic font)

Ribbon (Life exp.)
Black: cassette (2.5 million characters)
Dimensions
15.4 (W) x 10.9 (D) x 4.7 (H) inch
Weight
Approx. 10 lbs

Line Spacing
1/6, 1/8, 7/72, and 1/216 inch
Paper Feed
Adjustable tractor and friction feed
Printing Direction
Bi-directional
Copies
2 plus original

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No One Sells This Printer For Less!

Super Print Quality

BIG BLUE

Fantastic Price

80 Column Printer • 8½'' Letter Size

We Liked this Printer so much
We Bought Out the Factory

Special Low Sale Price!

Sale $29⁹⁵

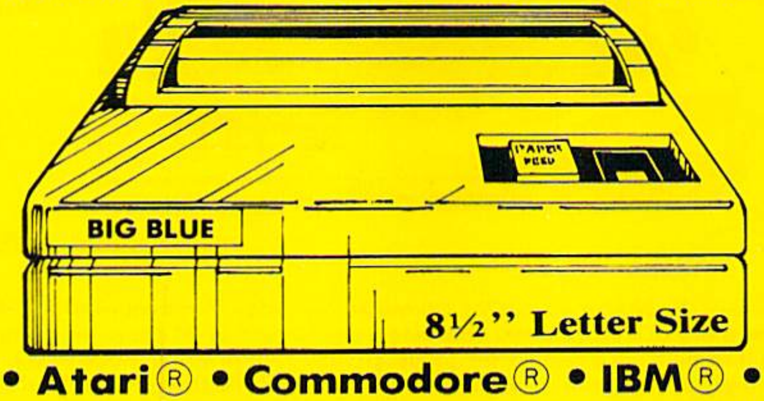
List $199

Special Low Sale Price!

(Add $7.50 for shipping & handling)

Now you can have a full fledged 8½'' letter size 80 column printer for less than the cost of a large box of paper. This printer uses advanced dot matrix, heat transfer technology to print upper and lower case (with true lower descenders), underline, and enlarged. Print program listings, wordprocessing pages, plus much more. Perfect for the homeowner or student and definitely affordable.

Save



Sale

For Apple® • Atari® • Commodore® • IBM® • Laser 128®

This printer was made by **Canon**® for the IBM. The Big Blue printer comes ready to hook up to the serial port of the **IBM**®PC jr. Plus with low cost adapter cables you can connect the Big Blue printer to the **Apple**® II,IIe,IIc, **Apple Compatibles, Atari**®, **Commodore**® 64 ,128, SX-64, Vic 20, Plus 4, **IBM**® PC, **IBM**®XT, **IBM**®AT, **IBM Compatibles** , Tandy 1000, and more.

Intelligent Commodore Interface - Print graphics, use Print Shop, word processors and more .... List $49.95 **Sale $19.95**
Intelligent Atari Interface - (All Atari Computers except 1200). Print graphics, Print Shop and more... List $49.95 **Sale $19.95**
RS-232 Adapter—Adapter for IBM® PC, AT, XT, & Apple® II series RS-232 port (specify male or female).. List $19.95 **Sale $ 9.95**
Laser128, Apple IIc Interface with Print Shop driver program.............. List $24.95 **Sale $12.95**
Paper (2 Rolls)........................ List $19.95 **Sale $ 5.95** **Single Sheet Paper** (Qty. 500)........ List $29.95 **Sale $12.95**

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•160 - 180 CPS • Near Letter Quality •

Lifetime Warranty**

Price Break Thru

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Below Wholesale Cost Prices!

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NLQ-180

10" Carriage
NLQ 180
All New up Front Panel Controls

NLQ-180 Premium Quality Printer

NLQ Selectable From Front Panel Controls
High Speed Dot Matrix• Super Graphics
8K Buffer frees up computer 4-times faster
Letter Quality Modes • Pica • Elite • Italics
Condensed • Centronics Parallel Port
Business or Personal • Tractor/Friction
Lifetime Warranty on Print Head**
6 Month Immediate Replacement Policy

Lifetime Warranty*

Fantastic Graphics

Fantastic Price

Sale

No One Sells This Printer For Less!

—— APPLE — ATARI — EPSON —— NLQ180 SPECIFICATIONS —— IBM — COMMODORE — ETC. ——

Print Buffer
8K bytes utility buffer
Printing Direction
Text Mode — Bi-directional
Graphic Mode — Uni-directional

Centronics Parallel Port

Paper
Plain paper, Roll paper, Single sheet
Fanfold, Multipart paper: max. 3 sheets (original plus 2 copies)
Character Fonts
Pica, Elite, Italics, Condensed

Printing Method
Impact dot matrix
Printing Speed
160-180 CPS at standard character printing
Printing Characters
Standard 9 x 9 dot matrix
NLQ 12 x 18 dot matrix (33cps)
Character size: 2.12 x 2.8 mm (standard)
Character sets: Full ASCII character set (96)
32 International characters

Ink Ribbon Cartridge
Ribbon Life: 3 million characters/cartridge
Physical Dimensions
Size: 15'' x 12'' x 5''
Weight: 12.7 lbs.
Maximum Number of Characters

Standard:	10 cpi	80 cpl
Standard enlarged:	5 cpi	40 cpl
Elite:	12 cpi	96 cpl
Elite enlarged:	6 cpi	48 cpl
Condensed:	17 cpi	132 cpl
Condensed enlarged:	8.5 cpi	66 cpl
Condensed elite:	20 cpi	160 cpl

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Pro 20 Daisy Wheel Printer

Wide Carriage Letter Quality Daisywheel Printer

Sale

20 CPS

(Add $10.00 shipping & handling.*)

Extra Accessories
Daisy Wheels — **$9.95**
Ribbons — **2 for $9.95**

Super Sale
$99.95

List $499

Printing Method
- Daisy Wheel

Print Buffer
- Standard: 93 characters

Print Speed
- 18 CPS, Shannon Text • 22 CPS, AAA Text

Accessories
- Daisy Print Wheel - Courier 10, 96-character • Ribbon Cartridge
- Both are compatible with: Diablo® and Qume®

Spacing and Density
- Character Spacing: 1/120" increments
- Line Spacing: 1/48" increments
- Print Pitch: 10, 12, or 15 CPI and Proportional Spacing
- Characters per Line: 110 at 10 CPI, 132 at 12 CPI, 165 at 15 CPI

Operator Control
- Self Test
- Out of Ribbon LED
- Horizontal Spacing Adjustment
- Pitch Adjustment (10, 12, or 15 CPI)
- Power On LED
- Impact Adjustment
- Reset Button
- Paper Feed Button
- Pause Button

Paper Information
- Fan-fold, Single Sheet, or Carbon Copies • Friction Feed
- Form Width: up to 13" • Copy Capacity: Original plus 3 Copies

Size and Weight
H-5.5" W-18.9" D-11.6" • Weight 21 lbs.

Pro 20 Interfaces
- IBM® PC . . . **Sale $19.95**
- Apple® IIc . . **Sale $19.95**
- Laser 128 . . . . **Sale $19.95**
- Commodore. . . . . **Sale $19.95**
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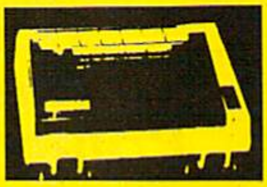
Wide Carriage Comstar 1500 Business Printer

- **120 CPS Print Speed**
- **Near Letter Quality Print Mode**
- **IBM Graphics Printer Compatible**
- **136 Column Wide Carriage**
- **Uses Inexpensive Spool Ribbons**

(Add $17.50 shipping & handling.*)



Printer Sale
$239.95

List $499

Printing Method
Impact Dot Matrix

Print Buffer
816 Bytes

Printing Speed
120 Characters per secon (at 10 CPI)

Paper Feed
10 Lines/second (at 1/5 inch line spacing); Sprocket or Friction Feed

Character Sets
96 Std. ASCII; 96 NLQ ASCII -83 Special & 50 Block Graphic Characters

Character Matrix
9 x 9 Standard Character; 12 x 6 Block Graphics;
8 dot x 60 dot/in. : 8 dot x 120 dot/in. -8 dot x 240 dot/in. Bit Image Modes.

Line Spacing
1/6, 1/8 or 7/72 inch standard; n/72 or n/216 inch programmable

Characters Per Line
Pica — 136 CPL; Condensed — 233 CPL; Pica Expanded — 68 CPL; Condensed Expanded — 116 CPL

Printing Width
Single Sheets — 5.5" to 14.5"; Continuous Paper — 4" to 15.5"

Centronics Parallel Port

Copies
Original Plus 2 Copies

Replacement Ribbons
Black . . . . **Sale $4.95**

Dimensions
H-5.80" W-15.2" D-12.4"

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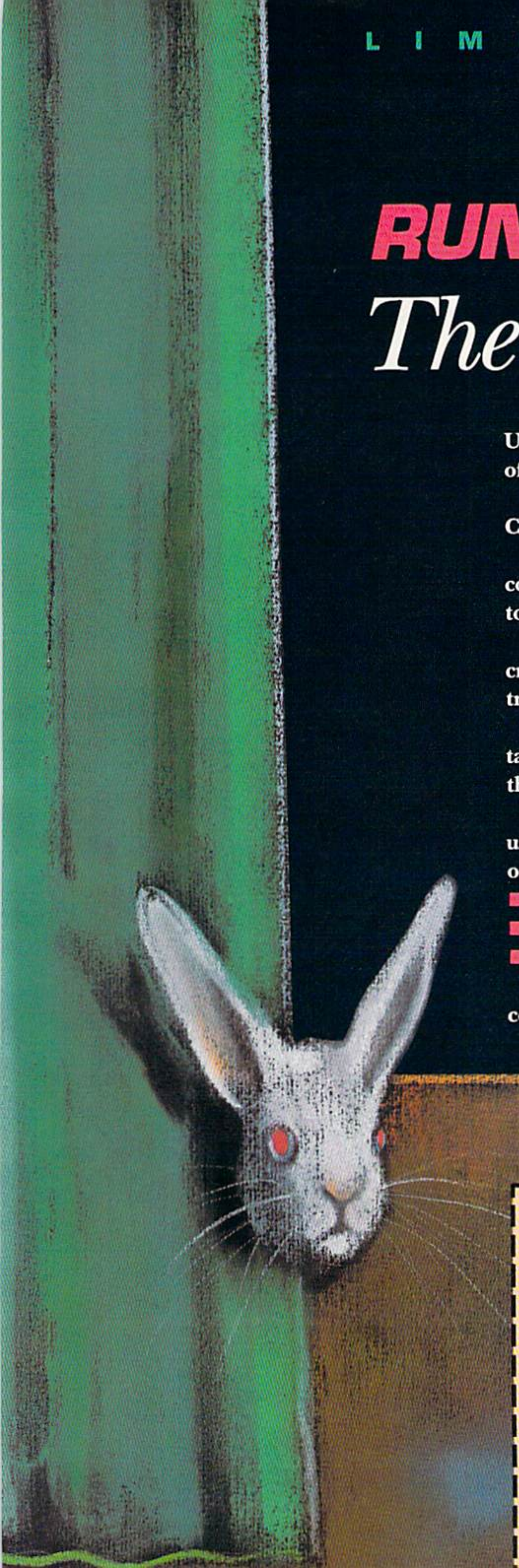
RUN's
The Best of Magic



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As a special bonus, this 64-page booklet also contains tables and charts of information that make programming the Commodore 64 and 128 computers easier.

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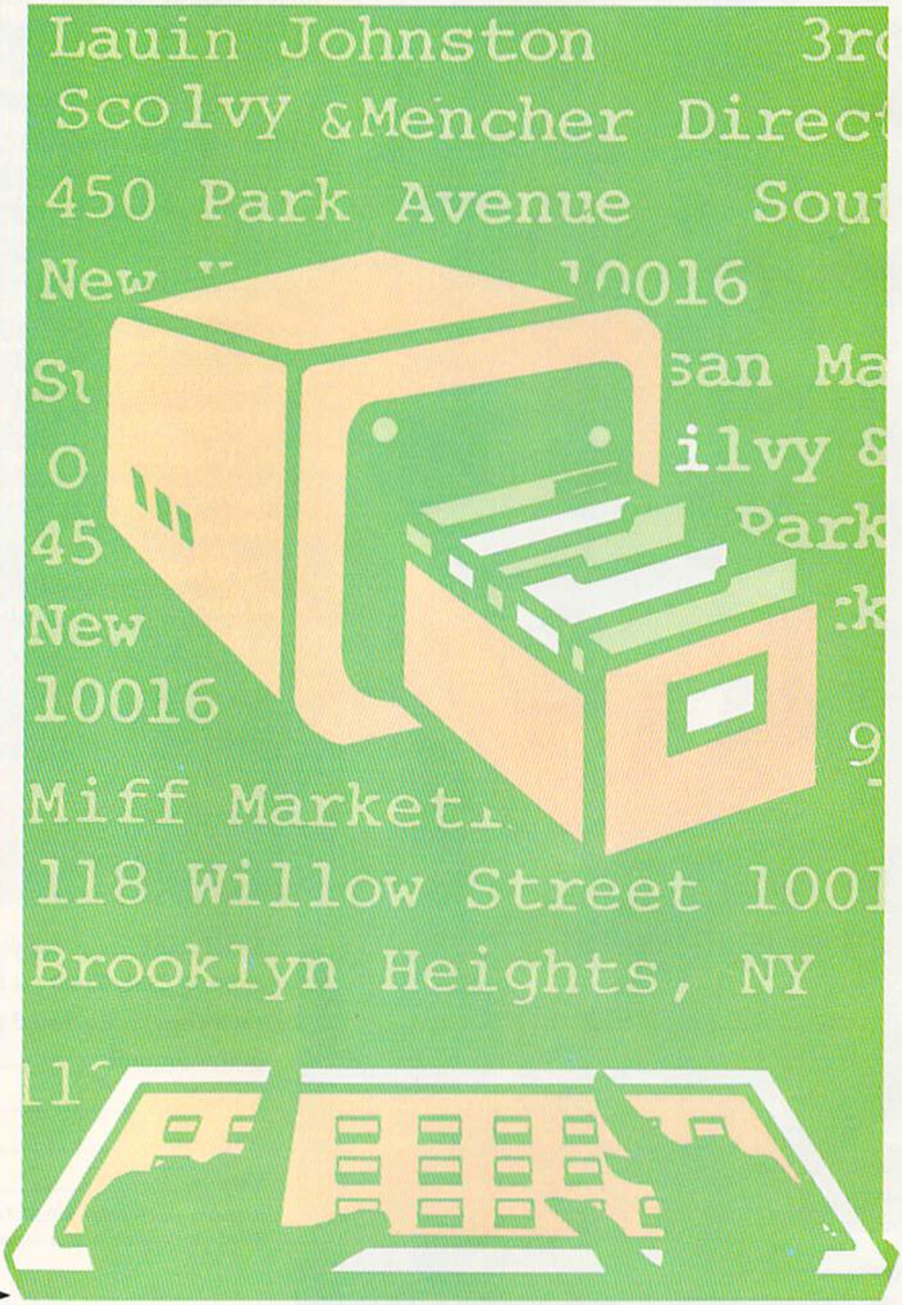
DFCopy

Tailor your Datafile files to meet your particular needs.

◇

By PAUL TURNER



I'm fascinated by Mike Konshak's Datafile series of programs. In my opinion, they're among the most powerful and easiest-to-use data management programs available.

In using Datafile, I've often needed special-purpose files composed of only some of the records in my Datafile files—for instance, a file of zip codes copied from an address file. So I wrote my own program, called DFCopy, to create them. (Naturally, the DF comes from Mike.) Although DFCopy uses routines similar to Mike's, it is in no way intended to infringe on his "claim to fame." Instead, I intend that it work in conjunction with the DF series of programs to provide additional data-management flexibility.

As I indicated, DFCopy creates a new file by copying records from a Datafile file that already exists. It copies only those records from the source file that meet certain specifications you input. It doesn't alter the source file in any way, nor does it alter the records it copies. It just moves them.

The beauty of DFCopy is that it eliminates any need to alter a source file's structure to tailor its data to special needs or to reenter data that you've already typed into the source file.

DFCOPYING

To use DFCopy, first enter LOAD "DFCOPY",8 and then RUN. The first screen that appears is an introduction. Next, the program asks for the name of the Datafile file you want to use as a source from which to copy data. Your response doesn't need to include the special characters, DF], that precede the filename. If you press return without entering a name, the program goes back to the introductory screen.

Assuming you have entered the name of a source file, the computer reads that file into memory and displays a list of its field names and lengths, then asks ►

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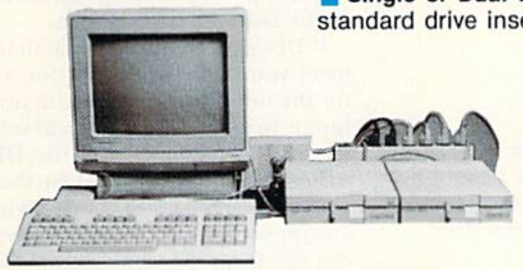

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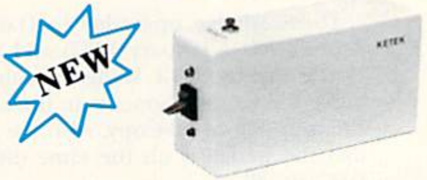

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you to specify the field you want to work with. A return without specifying a field brings you back to the screen for naming the source file.

Assuming you want to proceed, enter the field number. Then a list of logical operators will appear. DFCopy will use the operators that you specify for identifying data in the source file to be copied to the new file.

You'll find the operators listed in Table 1, along with their results for a sample run of DFCopy. The table assumes that the source file contains addresses and that its zip-code fields are the ones to be copied. It assumes further that all the zip codes in the source file are a full five digits long.

Back to the operation screen, enter the numbers for the logical operators you want to use (or zero to return to the field-selection screen). Any operators you choose will be listed at the top of the screen for reference.

Then you'll be asked to input the constant data—that is, the data strings DFCopy should search for in the source fields. The maximum length for each string is XXX. A return with no input of constant data brings you back to the field-selection display.

Refer again to the table, and note that the data string you input can be shorter than the length of the fields it'll be compared to. Just fill out the string with spaces. (That's what the # symbols in the table represent.) I coded the comparison this way to provide maximum flexibility in record selection.

After you've specified the operators and data strings you want to use, the program lists them for your final okay. An R for reject retrieves the operations-available screen; an A for accept starts construction of your new file. If DFCopy doesn't find any fields that meet your criteria, a message to that effect appears and the program returns to the field-selection screen.

If DFCopy does find some fields that meet your criteria, it asks for a name for the new file. A return with no name input brings back the field-selection screen. If you do name the file, DFCopy writes the file to disk. Then the field-selection screen comes back, giving you an opportunity to create another special file from the same source file.

Two special files can be built from a source file before you must read the source file into memory again. This limit lessens the chance of the computer going into "garbage collection."

Table 1. Sample logical operations for selecting data to be copied from a source file.

Number	Logical operator	Meaning	User input	Zip codes extracted from source file
1		None; exit		
2	=	Equal to	019##	01900–01999
3	>	Greater than	019##	02000–99999
4	<	Less than	019##	00000–01899
5	<>	Not equal to	019##	00000–01899 02000–99999 (01900–01999 aren't selected)
6	> =	Greater than or equal to	019##	01900–99999
7	< =	Less than or equal to	019##	00000–01999

DATAFILE 3.6

Those who've upgraded to Datafile 3.6 (see *RUN*, January 1987) and want to use the DOS 5.1 Wedge should remove the REM statements in lines 110, 120 and 300 of DFCopy. Also, be sure that the wedge is on the same disk as DFCopy. R

Paul Turner is a systems accountant and analyst for a manufacturing firm.

Listing 1. DFCopy program.

```
100 REM *** DFCOPY (C) JAN 1987
     BY PAUL H. TURNER ***
                          :REM*8
110 REM: IFFL=0THENFL=1:LOAD"DP
    ] DOS5.1",8,1       :REM*140
120 REM: IFFL=1THENFL=2:SYS5222
    4                   :REM*152
130 POKE 53280,13:POKE53281,11:
    GOTO170              :REM*30
140 A$=""               :REM*172
150 GETA$:IFA$=""THEN150:REM*92
160 RETURN              :REM*218
170 PRINT"{SHFT CLR}{CRSR DN}{C
    TRL 8} THIS PRG WILL {CTRL
    9} COPY {CTRL 0} RECORDS FR
    OM A"                :REM*58
180 PRINT" FILE CREATED BY {CTR
    L 9} DATAFILE {CTRL 0} BASE
    D ON "              :REM*148
190 PRINT" THE DATA IN THE SELE
    CTED FIELD OF THE"   :REM*80
200 PRINT" SOURCE FILE MEETING
    THE SPECIFIED"      :REM*212
210 PRINT"{SHFT SPACE}QUALFICAT
    IONS.{CRSR DN} "    :REM*158
220 PRINT" RECORDS OUTPUT TO TH
    E NEW FILE WILL"    :REM*116
230 PRINT" CONTAIN THE SAME DAT
    A AS THE SOURCE"      :REM*8
240 PRINT" {CTRL 9} DATAFILE {C
    TRL 0}.{2 CRSR DNs}":REM*84
250 PRINTTAB(6)"{2 CRSR DNs}ANY
     KEY TO CONT {CTRL 9} Q {CT
    RL 0} TO QUIT"      :REM*248
260 GOSUB140             :REM*15
270 IFA$="Q"THEN430     :REM*239
280 PRINT"{SHFT CLR}{CTRL 8}":C
    LR:Z$=CHR$(13):FL=2:REM*237
290 BB$="{39 SPACEs}"   :REM*223
300 REM: PRINTTAB(9)"{CTRL 9} A
    VAILABLE FILES ARE: {CTRL 0
    }{CRSR DN}":@"$0:DF]*"
                         :REM*55
310 PRINT"{CRSR DN} ENTER NAME
    OF SOURCE"           :REM*59
320 PRINT" {CTRL 9} DATAFILE {C
    TRL 0} TO BE COPIED{2 CRSR
    DNs}":CF$=""         :REM*49
330 PRINTTAB(5)"{CRSR DN}{CTRL
    9} RETURN WITH NO DATA TO E
    XIT {CTRL 0}{2 CRSR DNs}"
                        :REM*109
340 INPUT" ";CF$:IFCF$=""THEN11
    0                    :REM*13
350 OPEN15,8,15           :REM*1
360 OPEN4,8,4,"0:DF] "+CF$+",S,
    R"                  :REM*229
```

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DFCOPY

```
370 INPUT#15,EN$,EM$,ET$,ES$:IF
    EN$<"20"THEN440        :REM*53
380 PRINT"{SHFT CLR}{3 CRSR DNs
    }{3 SPACEs}{CTRL 9}{CTRL 2}
     DISK ERROR{3 SPACEs}"EN$",
     "EM$" {2 CRSR DNs}"
                          :REM*143
390 PRINTTAB(7)"{CTRL 9}R{CTRL
    0}UN PROGRAM AGAIN OR {CTRL
     9}Q{CTRL 0}UIT{CTRL 8}"
                           :REM*31
400 GOSUB140              :REM*155
410 IFA$="R"THENCLOSE4:CLOSE15:
    GOTO130                 :REM*1
420 IFA$<>"Q"THEN400      :REM*243
430 CLOSE5:CLOSE4:CLOSE15:POKE5
    3280,14:POKE53281,6:PRINT"{
    SHFT CLR}{CTRL 2}":END
                           :REM*83
440 INPUT#4,R,F,X         :REM*133
450 DIMF$(F+1),L%(F+1) :REM*153
460 DIMREC$(R+1,F+1),CR$(R+1,F+
    1)                    :REM*101
470 FORN=1TOF:INPUT#4,F$(N),L%(
    N)                    :REM*243
480 NEXTN:PRINT"{SHFT CLR}{CRSR
     DN}"                 :REM*221
490 FORI=1TOX:PRINT"{CRSR DN} L
    OADING RECORD #";I;"{2 CRSR
     UPs}"                 :REM*79
500 FORN=1TOF              :REM*13
510 INPUT#4,REC$(I,N)  :REM*185
520 NEXTN                 :REM*134
530 NEXTI                 :REM*104
540 CLOSE4:CLOSE15        :REM*224
550 PRINT"{SHFT CLR}{CRSR DN}{C
    TRL 9} #{2 SPACEs}FIELD ID
    "," LEN {CTRL 0}{2 CRSR DNs
    }"                    :REM*210
560 FORI=1TOF              :REM*34
570 PRINTI;" ";F$(I),L%(I)
                          :REM*106
580 NEXTI                 :REM*154
590 PRINT"{2 CRSR DNs}{4 SPACEs
    }WHICH FIELD # IS TO BE CHE
    CKED{CRSR DN}"         :REM*56
600 PRINTTAB(5)"{CRSR DN}{CTRL
    9} RETURN WITH NO DATA TO E
    XIT {CTRL 0}"         :REM*176
610 GOSUB140              :REM*110
620 FC=VAL(A$):IFFC=0THEN280
                          :REM*232
630 IFFC>FTHENPRINT"{2 CRSR UPs
    }":GOTO610            :REM*210
640 PRINT"{SHFT CLR}{CRSR DN} S
    ELECT "F$(FC)"{3 CRSR DNs}"
                          :REM*172
650 PRINTTAB(9)"{CTRL 9} OPERAT
    IONS AVAILABLE {CTRL 0}{CRS
    R DN}"                :REM*124
660 PRINT"{4 SPACEs}{CTRL 9} 0
    {CTRL 0}{4 SPACEs}NONE - {C
    TRL 9} EXIT {CTRL 0}"
                           :REM*98
670 PRINT"{4 SPACEs}{CTRL 9} 1
    {CTRL 0} ={2 SPACEs}EQUAL T
    O"                    :REM*218
680 PRINT"{4 SPACEs}{CTRL 9} 2
    {CTRL 0} >{2 SPACEs}GREATER
     THAN"                :REM*130
690 PRINT"{4 SPACEs}{CTRL 9} 3
    {CTRL 0} <{2 SPACEs}LESS TH
    AN"                   :REM*250
700 PRINT"{4 SPACEs}{CTRL 9} 4
    {CTRL 0} <> NOT EQUAL TO"
                           :REM*78
710 PRINT"{4 SPACEs}{CTRL 9} 5
    {CTRL 0} >= GREATER THAN OR
     EQUAL TO"            :REM*246
720 PRINT"{4 SPACEs}{CTRL 9} 6
    {CTRL 0} <= LESS THAN OR EQ
    UAL TO{2 CRSR DNs}":REM*114
730 PRINTTAB(9)"{CTRL 9} ENTER
    # OF OPERATION {CTRL 0}{2 C
    RSR DNs}"             :REM*178
740 GOSUB140              :REM*240
750 A=VAL(A$):IFA=0THEN550
                          :REM*114
760 IFA>6THENPRINT"{CRSR UP}"BB
    $:GOTO740               :REM*4
770 IFA=1THENOS$="="    :REM*177
780 IFA=2THENOS$=">"    :REM*235
790 IFA=3THENOS$="<"    :REM*245
800 IFA=4THENOS$="<>"    :REM*43
810 IFA=5THENOS$=">="    :REM*85
820 IFA=6THENOS$="<="    :REM*95
830 PRINT"{SHFT CLR}{CRSR DN} S
    ELECT "F$(FC)" "OS$"{3 CRSR
     DNs}"                :REM*133
840 PRINT" INPUT CONSTANT DATA
     - MAX LEN"L%(FC)"{CRSR DN}"
    :CD$=""               :REM*207
850 PRINTBB$:INPUT"{CRSR UP} ";
    CD$                   :REM*221
860 IFCD$=""THEN640       :REM*29
870 IFLEN(CD$)>L%(FC)THENPRINT"
    {2 CRSR UPs}":GOTO850
                           :REM*93
880 PRINT"{SHFT CLR}{CRSR DN} Y
    OU WISH TO SELECT RECORDS F
    ROM FILE{CRSR DN}" :REM*181
890 PRINT" {CTRL 9} "CF$" {CTRL
     0} BASED ON DATA CONTAINED
    {CRSR DN}"             :REM*27
900 PRINT" IN FIELD NAME {CTRL
    9} "F$(FC)" {CTRL 0} THAT A
    RE{CRSR DN}"          :REM*149
910 PRINT" {CTRL 9} "OS$" "CD$"
     {CTRL 0}{4 CRSR DNs}"
                          :REM*213
920 PRINTTAB(12)"{CTRL 9}A{CTRL
     0}CCEPT OR {CTRL 9}R{CTRL
    0}EJECT"               :REM*73
930 GOSUB140              :REM*175
940 IFA$="R"THEN550        :REM*37
950 IFA$<>"A"THEN930       :REM*79
960 PRINT"{SHFT CLR}{10 CRSR DN
    s}"                   :REM*237
970 NR=0:SD=LEN(CD$)       :REM*89
980 FORI=1TOX             :REM*207
990 PRINTTAB(8)"{CTRL 9} CHECKI
    NG RECORD # "I"{CRSR UP}{CT
    RL 0}"                 :REM*27
1000 ONAGOTO1010,1030,1050,1070
     ,1090,1110            :REM*29
1010 IFLEFT$(REC$(I,FC),SD)=CD$
     THEN1130             :REM*227
1020 GOTO1120              :REM*21
1030 IFLEFT$(REC$(I,FC),SD)>CD$
     THEN1130             :REM*240
1040 GOTO1120              :REM*42
1050 IFLEFT$(REC$(I,FC),SD)<CD$
     THEN1130              :REM*20
1060 GOTO1120              :REM*62
1070 IFLEFT$(REC$(I,FC),SD)<>CD
     $THEN1130            :REM*192
1080 GOTO1120              :REM*82
1090 IFLEFT$(REC$(I,FC),SD)>=CD
     $THEN1130            :REM*212
1100 GOTO1120             :REM*102
1110 IFLEFT$(REC$(I,FC),SD)<=CD
     $THEN1130            :REM*248
1120 NEXTI:GOTO1180        :REM*10
1130 NR=NR+1               :REM*76
1140 FORCD=1TOF            :REM*22
1150 CR$(NR,CD)=REC$(I,CD)
                          :REM*162
1160 NEXTCD               :REM*244
1170 GOTO1120             :REM*172
1180 IFNR=0THENPRINT"{SHFT CLR}
     "TAB(11)"{2 CRSR DNs}{CTRL
      9} NO RECORDS COPIED":FOR
     T=1TO1500:NEXT:GOTO550
                           :REM*64
1190 PRINT"{SHFT CLR}{CRSR DN}
     NAME OF NEW FILE" :REM*182
1200 PRINT" LIMITED TO 12 CHARS
     {2 CRSR DNs}":NF$=""
                          :REM*104
1210 INPUT" ";NF$         :REM*176
1220 IFLEN(NF$)>12THEN1190
                          :REM*160
1230 IFNF$=""THEN550       :REM*12
1240 OPEN15,8,15          :REM*126
1250 OPEN5,8,5,"0:DF] "+NF$+",S
     ,W"                   :REM*42
1260 INPUT#15,EM$,EN$,ET$,ES$:I
     FEM$<"20"THEN1330 :REM*194
1270 PRINT"{SHFT CLR}{CRSR DN}{
     3 SPACEs}{CTRL 9}{CTRL 2}
     DISK ERROR{2 SPACEs}"EN$",
      "EM$"{2 CRSR DNs}":REM*12
1280 PRINTTAB(8)"{CTRL 9}R{CTRL
      0}ENAME NEW FILE OR {CTRL
      9}Q{CTRL 0}UIT{CTRL 8}"
                          :REM*131
1290 GOSUB140              :REM*25
1300 IFA$="Q"THEN430      :REM*249
1310 IFA$="R"THENCLOSE5:CLOSE15
     :GOTO1190             :REM*23
1320 GOTO1290              :REM*53
1330 PRINT#5,R;Z$;F;Z$;NR
                           :REM*75
1340 FORN=1TOF             :REM*89
1350 PRINT#5,F$(N);Z$;L%(N)
                           :REM*21
1360 NEXTN:PRINT          :REM*169
1370 FORI=1TONR:PRINT"{CRSR DN}
      SAVING RECORD #";I;"{2 CR
     SR UPs}"              :REM*27
1380 FORN=1TOF:PRINT#5,CR$(I,N)
     :NEXTN:NEXTI         :REM*159
1390 WF=WF+1:IFWF=2THENCLOSE5:C
     LOSE4:CLOSE15:GOTO130
                          :REM*129
1400 CLOSE5:CLOSE4:CLOSE15:GOTO
     550                  :REM*217 ■
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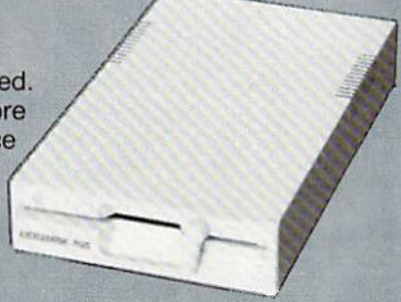

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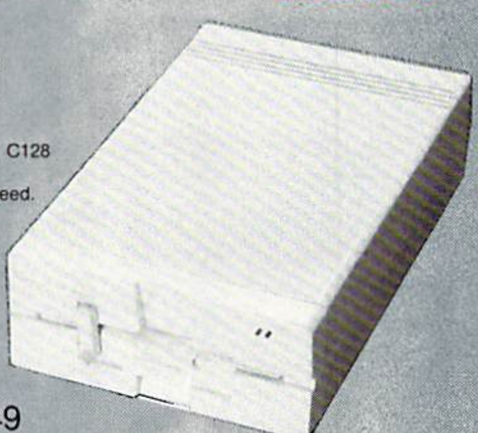

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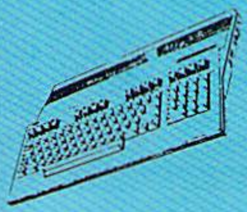

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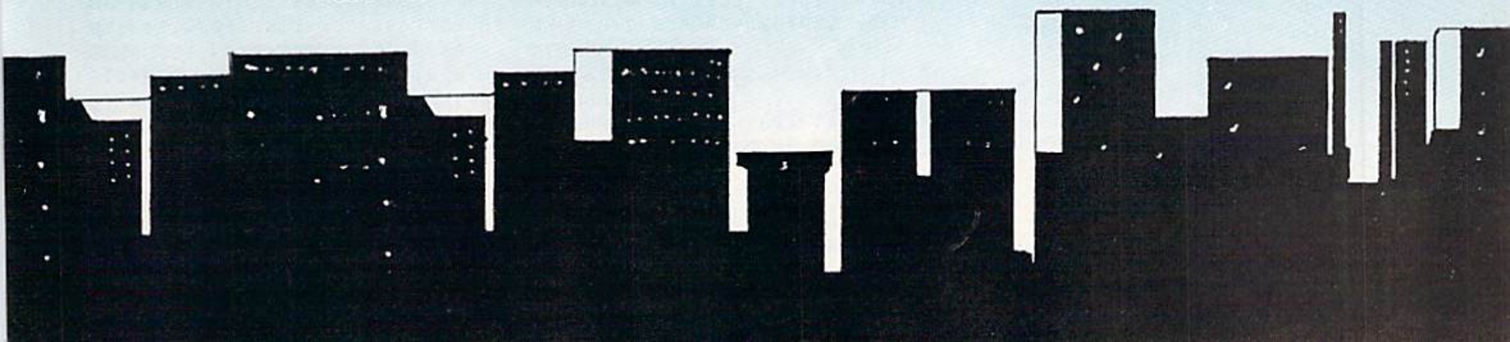


Pop-up Directory Window

At last—a directory-display program that doesn't interfere with the screen behind it.

◇

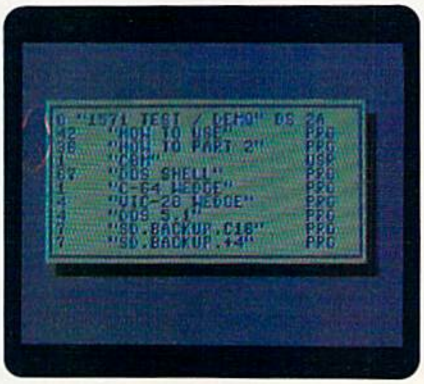
By DAVID MORRIS

If you ever need to access a disk directory on your C-64 while writing or running a program, then this handy utility is for you. I know what you're probably thinking—you've already seen scores of "directory readers" in magazines and elsewhere. Well, this program is different, because it leaves the screen "behind" the window intact.

Directory Window is a machine language, interrupt-driven program that resides at memory address $C000, where it's safe from everything but programs that occupy the same location. Furthermore, it's compatible with most machine language programs that don't use this area of memory.

Type in Listing 1, using 64 Perfect Typist, and be sure to save it to disk before running it, because the listing disappears during execution. After you run Directory Window, the only way it can be disabled is with SYS 49152 or by resetting the computer. Run-stop/restore works as usual, except that it doesn't disable Directory Window or reset the screen background, border and text colors to their default values.

After Directory Window reads its data into memory, you're prompted to specify a solid or clear window. If you choose a solid window, you can pick its color; if you choose a clear window, you can select the color of the text within the window. These settings can be changed at any time. The program then displays the SYS command to activate and deactivate Directory Window.



```
0 "1571 TEST / DEMO" DS 2A
42   "HOW TO USE"          PRG
36   "HOW TO PART 2"       PRG
1    "CBM"                 USR
67   "DOS SHELL"           PRG
1    "C-64 WEDGE"          PRG
4    "VIC-20 WEDGE"        PRG
4    "DOS 5.1"             PRG
7    "SD.BACKUP.C16"       PRG
7    "SD.BACKUP.+4"        PRG
```

Sample window directory, created with Directory Window.

After activating it, make sure a disk is in the drive, then press control/D. A window will appear in the center of the screen and display the disk directory, ten lines at a time. If you have more than ten files on the disk, press the space bar to display the next ten. To close the window, press the run-stop key. The window will disappear, and the screen behind the window will be restored as it was, including the original colors and cursor position.

If you want to specify the background, border and text colors for the screen behind the window, set them in the usual manner. As I indicated, run-stop/restore won't change those colors to the defaults.

You can access Directory Window while another program is running. The other program pauses while the directory is read and displayed, then, when you close the window, it continues where it left off.

Note: Some machine language programs, particularly those that alter the vectors at $0300–$030B, may not be compatible with Directory Window. Also, Directory Window is incompatible with the Epyx Fast Load cartridge.

There you have it—a fast, easy-to-use program for displaying your disk directory at the touch of a key. Ⓡ

David Morris is a computer major with six years of programming experience on Commodores. He uses his C-128 to do lab work by connecting to his college's mainframe.

Listing 1. Directory Window program.

```
10 REM DIRECTORY WINDOW BY D. W
   . MORRIS                :REM*40
20 PRINT"{SHFT CLR}":C=0:FORA=4
   9152TO50132:READB:C=C+B:POKE
   A,B                     :REM*74
30 PRINT"{HOME}READING DATA..."
   :NEXT                   :REM*36
40 IFC<>113408THENPRINT"{CRSR D
   N}ERROR IN DATA.":STOP
                           :REM*84
50 INPUT"{CRSR DN}SOLID OR CLEA
   R WINDOW{2 SPACEs}S{3 CRSR L
   Fs}";A$:A$=LEFT$(A$,1)
                           :REM*40
60 IFA$<>"S"ANDA$<>"C"THENPRINT
   "{3 CRSR UPs}":GOTO50:REM*28
70 POKE49449,0:POKE50022,146:IF
   A$="S"THENPOKE49449,1:POKE50
   022,18:GOTO110         :REM*178
80 INPUT"{CRSR DN}TEXT COLOR (0
   -15){2 SPACEs}1{3 CRSR LFs}"
   ;B$:B=VAL(B$)          :REM*114
90 IFB<0ORB>15THENPRINT"{3 CRSR
    UPs}":GOTO80          :REM*238
100 POKE50132,B            :REM*44
110 INPUT"{CRSR DN}WINDOW COLOR ►
```

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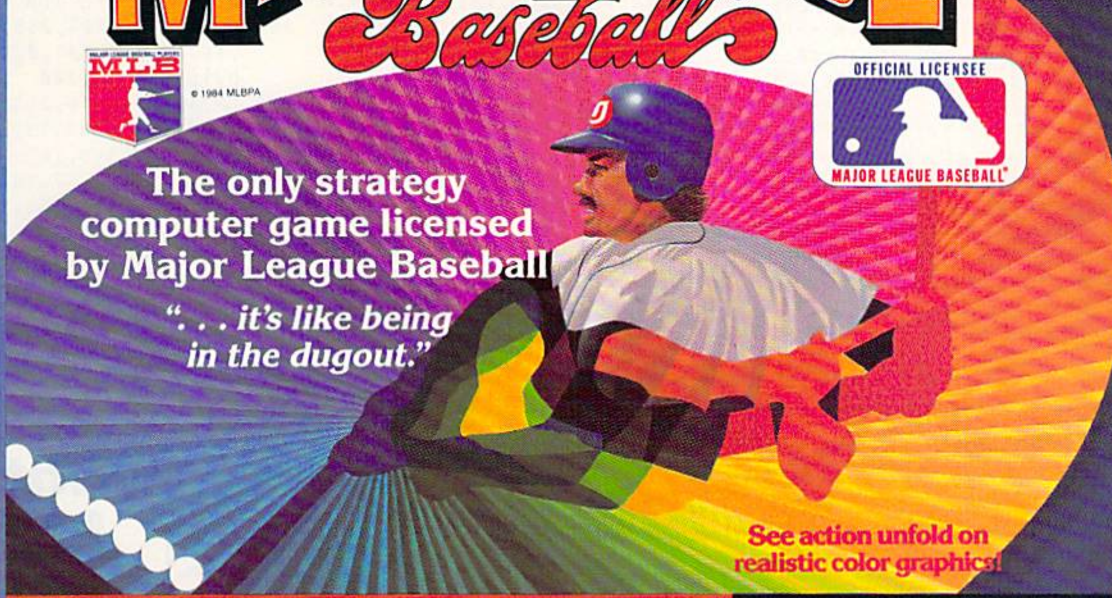

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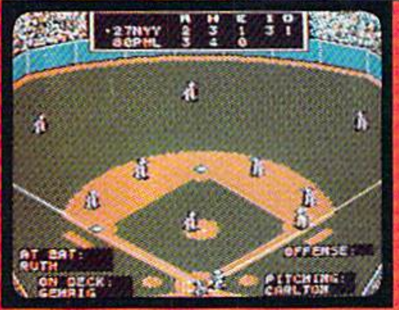

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```
     (0-15){2 SPACEs}15{4 CRSR
    LFs}";C$:C=VAL(C$)   :REM*50
120 IFC<0ORC>15THENPRINT"{3 CRS
    R UPs}":GOTO110      :REM*80
130 POKE50131,C:IFA$="S"THENPOK
    E50132,C             :REM*46
140 PRINT"{2 CRSR DNs}{CTRL 9}S
    YS 49152{CTRL 0} ACTIVATES/
    DEACTIVATES{CRSR DN}"
                        :REM*124
150 PRINT" CTRL-D OPENS WINDOW"
                         :REM*52
160 PRINT" SPACEBAR CONTINUES D
    ISPLAY"              :REM*38
170 PRINT" RUN/STOP CLOSES WIND
    OW"                 :REM*236
180 SYS49152:NEW        :REM*114
190 DATA 169,192,205,21,3,240,4
    0,169,133,160,194,32,30,171
    ,120,173,20,3       :REM*246
200 DATA 133,189,173,21,3,133,1
    90,169,123,141,20,3,169,192
    ,141,21,3,169,77    :REM*218
210 DATA 141,24,3,169,192,141,2
    5,3,88,96,120,165,189,141,2
    0,3,165,190,141      :REM*60
220 DATA 21,3,169,71,141,24,3,1
    69,254,141,25,3,88,169,23,1
    60,195,32,30,171     :REM*12
230 DATA 96,120,72,138,72,152,7
    2,169,4,141,136,2,32,188,24
    6,32,225,255,240    :REM*190
240 DATA 3,76,114,254,32,163,25
    3,32,24,229,165,169,141,134
    ,2,165,170,141      :REM*182
250 DATA 32,208,165,171,141,33,
    208,108,2,160,173,141,2,201
    ,4,208,6,165,197    :REM*144
260 DATA 201,18,240,18,173,134,
    2,133,169,173,32,208,133,17
    0,173,33,208,133    :REM*241
270 DATA 171,108,189,0,120,165,
    189,141,20,3,165,190,141,21
    ,3,88,32,106,194     :REM*91
280 DATA 173,40,3,133,180,169,2
    34,141,40,3,162,1,134,204,1
    34,207,202,134      :REM*189
290 DATA 212,134,144,181,0,157,
    0,207,232,208,248,162,3,160
    ,0,177,251,145      :REM*179
300 DATA 155,177,253,145,158,20
    0,208,245,230,252,230,156,2
    30,254,230,159      :REM*171
310 DATA 202,208,232,32,1,194,1
    69,2,162,207,160,195,32,189
    ,255,169,15,174     :REM*111
320 DATA 206,195,160,15,32,186,
    255,32,192,255,144,3,76,155
    ,193,169,15,32      :REM*109
330 DATA 195,255,169,2,162,209,
    160,195,32,189,255,169,1,17
    4,206,195,160,0     :REM*151
340 DATA 132,168,32,186,255,32,
    192,255,162,1,32,198,255,17
    6,121,32,207,255    :REM*145
350 DATA 32,207,255,162,1,134,1
    99,166,144,208,107,32,207,2
    55,32,207,255,32     :REM*57
360 DATA 207,255,133,195,32,207
    ,255,133,196,166,144,208,10
    3,166,167,160,5     :REM*183
370 DATA 24,32,240,255,24,165,1
    96,166,195,32,205,189,169,3
    2,32,210,255,160    :REM*191
380 DATA 0,32,207,255,105,0,153
    ,167,2,200,201,0,208,243,16
    8,185,167,2,240     :REM*219
390 DATA 8,32,210,255,200,192,2
    5,208,243,169,13,32,210,255
    ,230,167,165,167     :REM*75
400 DATA 24,201,17,144,164,24,1
    69,0,133,198,165,145,201,12
    7,240,12,165,197    :REM*215
410 DATA 201,60,208,244,32,1,19
    4,76,40,193,32,204,255,169,
    1,32,195,255,169      :REM*9
420 DATA 15,32,195,255,76,185,1
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HOT SHOT PLUS vs SUPER GRAPHIX SR.	Super Graphics Sr.	Hot Shot PLUS
NUMBER OF BUILT IN FONTS	1	6
POSSIBLE FONTS IN MEMORY	3	42
STANDARD BUFFER PROVIDED	8K	8K
BUFFER USER EXPANDABLE	NO	YES
MAXIMUM BUFFER EXPANSION	n/a	64K
BUILT IN ITALIC & BOLD FONTS	NO	YES
BUILT IN FONT EDITOR	NO	YES
FONT EDITOR PLUS4 COMPATIBLE	NO	YES
GRAPHICS ENHANCEMENT SELECTION	NO	YES
GEOS™ FONT ENHANCEMENT SELECTION	NO	YES
CPM SELECTION	NO	YES

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SO: We think the features above show the Hot Shot PLUS is a far better choice than the Xetec Super Graphics Sr at the same list price. Don't buy a printer interface until you get more information on these products! Call us today to ask us why you should choose our interfaces. This ad does not let us fully describe the features of these products. These are the best printer interfaces on the market, and we know you will like them better than any other. We also have a trade-in offer and other incentives! Call us and let us send you full information. Or mark the reader service card if you're not in a hurry. But don't choose less satisfaction. Instead, **call us today!**

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```
     93,32,204,255,169,1,32,195,
     255,165,145,201          :REM*35
430 DATA 127,208,250,32,106,194
     ,162,3,160,0,177,155,145,25
     1,177,158,145            :REM*31
440 DATA 253,200,208,245,230,15
     6,230,252,230,159,230,254,2
     02,208,232,120           :REM*37
450 DATA 162,0,189,0,207,149,0,
     232,208,248,88,165,169,141,
     134,2,32,14,192         :REM*181
460 DATA 165,145,201,255,208,25
     0,162,0,134,207,134,198,232
     ,134,204,165,180        :REM*157
470 DATA 141,40,3,108,189,0,162
     ,6,134,167,160,4,24,32,240,
     255,173,211,195         :REM*163
480 DATA 141,134,2,169,67,160,1
     95,32,30,171,230,167,169,10
     ,133,168,166,167        :REM*105
490 DATA 160,4,24,32,240,255,17
     3,211,195,141,134,2,169,100
     ,160,195,32,30           :REM*91
500 DATA 171,230,167,198,168,20
     8,229,166,167,160,4,24,32,2
     40,255,173,211          :REM*231
510 DATA 195,141,134,2,169,137,
     160,195,32,30,171,230,167,1
     66,167,160,5,24         :REM*171
520 DATA 32,240,255,169,172,160
     ,195,32,30,171,169,7,133,16
     7,173,212,195           :REM*148
530 DATA 141,134,2,96,169,244,1
     33,251,133,253,133,155,133,
     158,169,4,133           :REM*140
540 DATA 252,169,216,133,254,16
     9,196,133,156,169,200,133,1
     59,96,13,18,176          :REM*48
550 DATA 96,96,96,96,96,96,96,9
     6,96,96,96,96,96,96,96,96,9
     6,96,96,96,174          :REM*202
560 DATA 13,18,125,45,45,68,73,
     82,69,67,84,79,82,89,32,87,
     73,78,68,79,87          :REM*232
570 DATA 45,45,125,13,18,125,40
     ,67,41,49,57,56,54,32,68,65
     ,86,73,68,32,77         :REM*124
580 DATA 79,82,82,73,83,125,13,
     18,125,67,84,82,76,45,68,32
     ,70,79,82,32,68          :REM*18
590 DATA 73,82,69,67,84,79,82,8
     9,125,13,18,125,82,85,78,47
     ,83,84,79,80,32          :REM*92
600 DATA 75,69,89,32,84,79,32,6
     9,88,73,84,125,13,18,173,96
     ,96,96,96,96,96          :REM*28
610 DATA 96,96,96,96,96,96,96,9
     6,96,96,96,96,96,96,189,13,
     0,13,18,176,96           :REM*96
620 DATA 96,96,96,96,96,96,96,9
     6,96,174,13,18,125,87,73,78
     ,68,79,87,32,79          :REM*60
630 DATA 70,70,125,13,18,173,96
     ,96,96,96,96,96,96,96,96,96
     ,189,13,0,18,176         :REM*88
640 DATA 96,96,96,96,96,96,96,9
     6,96,96,96,96,96,96,96,96,9
     6,96,96,96,96,96        :REM*172
650 DATA 96,96,96,96,96,96,96,1
     74,0,18,125,18,32,32,32,32,
     32,32,32,32,32          :REM*172
660 DATA 32,32,32,32,32,32,32,3
     2,32,32,32,32,32,32,32,32,3
     2,32,32,32,18           :REM*224
670 DATA 125,144,32,0,18,173,96
     ,96,96,96,96,96,96,96,96,96
     ,96,96,96,96,96          :REM*82
680 DATA 96,96,96,96,96,96,96,9
     6,96,96,96,96,96,96,189,144
     ,32,0,18,32,32          :REM*160
690 DATA 32,32,32,32,32,32,32,3
     2,32,32,32,32,32,32,32,32,3
     2,32,32,32,32,32        :REM*176
700 DATA 32,32,32,32,32,32,32,1
     46,0,8,73,48,36,48,15,15
                              :REM*82
```

■

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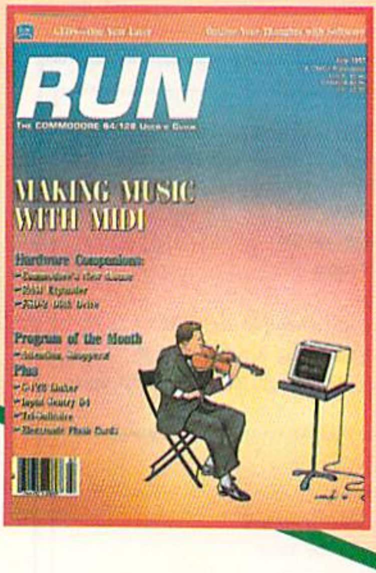

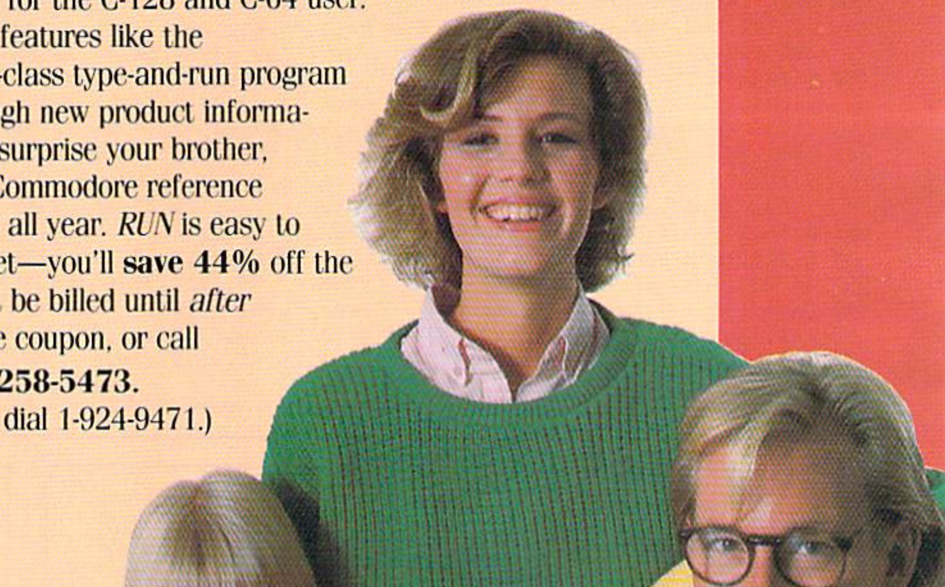

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Circle 98 on Reader Service card.

Array Arranger

Programmers will love this high-speed utility for manipulating string arrays.

◇

By JONATHAN HOLUTA

If you've ever written a program that uses first and last names, you may have been faced with some dilemmas. Should you store the names in an array? Should the first and last names be separated? Should the last name be first? What if you wanted to sort them by last name, but print with the first name first?

Three-Way Switch is a powerful utility program that will help solve such problems by letting you store the first and last names, in either order, in one element of an array, and then "switch" the order at your command. It's a machine language program that borrows no memory from Basic, and it uses no intermediate strings that can cause "garbage collection" delays.

SEQUENCE SWITCHES

Let's say you've stored a list of 100 names in an array called N$(100), with the last name first for easy sorting. Here are a few sample elements:

```
N$(1) = "JONES WILLIAM"
N$(2) = "SMITH ROBERT"
N$(3) = "JOHNSON CLIFFORD"
. . .
N$(99) = "JEFFERSON ERNESTINE"
N$(100) = "THOMPSON HARLAN"
```

You'd like to print them out with the first name first, but you don't want to change the array. With Three-Way Switch in place, all you have to do is include the following in your program:

```
SYS 49152,A$,N$(X)
```

and then print A$. If X = 1, variable A$ will hold the switched name and print WILLIAM JONES. You can use a loop to print the entire list, first name first, without having to change the names in the N$ array.

CASE AND LENGTH SWITCHES

Now, let's suppose you want to print the names in upper- and lowercase, but ►

B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
R
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A great value for only **$29⁹⁵**

Super Parameters ICON SPECIAL

NEW

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JOYSTICK REQUIRED.

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Circle 187 on Reader Service card

they're stored in uppercase only. This time include:

SYS 49159,A$,N$(X)

and print A$. Like magic, A$ now contains the switched name with the first and last names capitalized (Harlan Thompson, if X = 100). Any middle initials will also be capitalized.

This function of Three-Way Switch is handy for mailing lists, databases, customer lists, and the like. The program will also shorten names for you, if your printing format only allows a certain number of characters in a column. The default length is 25. If you have space for only 17 characters, include:

POKE 49411,(L + 1)

where L is the length you don't want to exceed—in this case, 17. Then include:

SYS 49159,A$,N$(X)

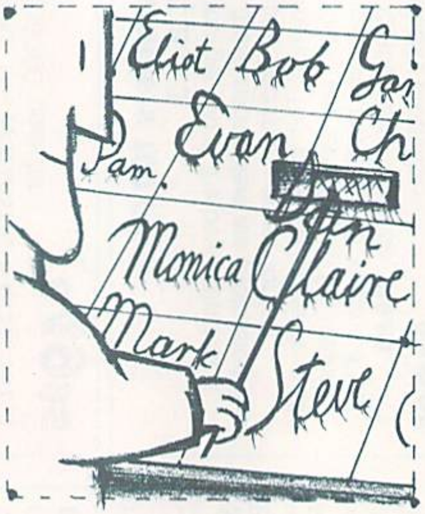
Variable A$ will now be E. Jefferson, if X = 99, but N$(99) will remain JEFFERSON ERNESTINE. If you don't want the capitalization feature, include the POKE 49411,(L + 1), but change the SYS command to SYS 49152,A$,N$(X). The name will still be switched and shortened, but without the case change.

ARRAY SWITCHES

The real power of Three-Way Switch lies in its third type of switching. Let's say your list of names is stored first name first, and you want to call a routine to sort by last name. The entire array must be switched before calling the sort routine. Three-Way Switch can do it. Just include:

SYS 49730,E,N$(0)

where E is the number of elements in the array. Before you can blink, the entire array will be switched, and you can call your sort routine. To switch the array back, just use another SYS 49730,E,N$(0), and instantly the entire array will revert to its former state.



This is a powerful command, because it actually changes the names in memory. If your name strings are read from a disk file or typed in as user input, the actual text is stored from the top of memory down (which is usually transparent to the user). If your strings are read from Data statements, the actual text is stored in the program. By entering the SYS 49730,E,N$(0) command after an array of strings is read from Data statements and then listing the program, you can see that the actual program text has been switched. A line that was:

500 DATA JONES WILLIAM,SMITH
ROBERT,JOHNSON CLIFFORD

will now be:

500 DATA WILLIAM JONES,ROBERT
SMITH,CLIFFORD JOHNSON

PROGRAM DESCRIPTION

You needn't know anything about machine language to use Three-Way Switch, but if you're interested, here's a brief explanation of how it works.

The program first stores some zero-page values in the cassette buffer, so part of the zero page can be used during execution. Entering at 49152 sets a flag to skip the capitalization routine; entering at 49159 resets the flag.

Next the program determines where in memory the array is located and sets the pointer for the printing string. This step allows you to use any valid string name and any valid array name.

Then it scans the name, one character at a time, until it finds a space (CHR$(32)), moves that portion to the end and stores the switched name. Finally, it resets the zero page to its original values and returns execution to Basic.

Since the first portion of the string is moved to the end, a name like FRANCIS F. FISHER becomes F. FISHER FRANCIS. Switching again makes it FISHER FRANCIS F., and a third switch returns it to FRANCIS F. FISHER. Since the switches are lightning fast, you can write in as many as you need.

Listing 1 pokes the numbers in the Data statements directly into memory. Be sure to save the listing before you run it, because, if the checksum is correct, the Basic portion will be erased, leaving only the machine language in memory. The machine language remains there until the computer is turned off or another machine language program is loaded over it.

Listing 2, written entirely in Basic, demonstrates all of Three-Way Switch's functions. Load and run it after running Listing 1.

I hope you enjoy using Three-Way Switch. I wrote it for some personal applications, but, since I've learned so many things from *RUN*, I wanted to share it with other readers. 🅁

Jonathan Holuta, a VIC-20 and C-64 user for many years, is a maintenance electrician with White Consolidated Industries.

Listing 1. Three-Way Switch program.

```
10 POKE53281,1:PRINT"{SHFT CLR}
   {2 CRSR DNs}{CTRL 1}PLEASE W
   AIT! LOADING PROGRAM":REM*22
20 FORX=49152TO49474      :REM*68
30 READA:POKEX,A:PRINT"{HOME}{7
    CRSR DNs}{CTRL 9}"X:C=C+A
                          :REM*18
40 NEXT                   :REM*50
50 FORX=49730TO49930     :REM*254
60 READA:POKEX,A:PRINT"{HOME}{7
    CRSR DNs}{CTRL 9}"X:C=C+A
                          :REM*48
70 NEXT                   :REM*80
80 IFC<>75981THENPRINT"{2 CRSR
   DNs}ERROR IN DATA STATEMENTS
   ":END                  :REM*96
90 PRINT"{2 CRSR DNs}OK DONE":N
   EW                     :REM*80
100 DATA 169,1,133,251,76,11,19
    2,169,0,133,251,32,33,192,3
    2,2,193,32,57        :REM*130
110 DATA 192,32,86,192,32,55,19
    3,32,190,192,32,45,192,96,1
    60,25,185,216,0      :REM*230
120 DATA 153,60,3,136,208,247,9
    6,160,25,185,60,3,153,216,0
    ,136,208,247,96      :REM*178
130 DATA 32,253,174,32,158,173,
    165,71,133,219,165,72,133,2
    20,32,253,174,32      :REM*28
140 DATA 158,173,165,71,133,217
    ,165,72,133,218,96,160,2,17
    7,217,153,221,0       :REM*66
150 DATA 136,16,248,160,255,200
    ,196,221,176,58,177,222,201
    ,32,208,245,140       :REM*98 ►
```

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```
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    ,177,222,157,65,193,196,221
    ,144,245,169,32      :REM*228
170 DATA 157,65,193,160,255,200
    ,232,177,222,157,65,193,204
    ,63,193,144,244      :REM*136
180 DATA 160,0,165,221,145,219,
    200,169,65,145,219,200,169,
    193,145,219,96        :REM*10
190 DATA 160,0,177,222,153,65,1
    93,200,196,221,144,246,160,
    0,165,221,145         :REM*80
200 DATA 219,200,169,65,145,219
    ,200,169,193,145,219,96,165
    ,221,201,12,176      :REM*196
210 DATA 1,96,160,255,200,196,2
    21,176,47,192,12,176,43,185
    ,65,193,201,32       :REM*194
220 DATA 208,240,162,1,169,46,1
    57,65,193,232,185,65,193,15
    7,65,193,232,200      :REM*28
230 DATA 185,65,193,157,65,193,
    196,221,144,244,224,12,176,
    6,138,160,0,145       :REM*60
240 DATA 219,96,160,0,169,11,14
    5,219,96,169,25,141,193,192
    ,141,205,192,141     :REM*106
250 DATA 242,192,168,136,152,14
    1,254,192,96,160,0,185,65,1
    93,9,128,153,65      :REM*130
260 DATA 193,200,196,221,176,19
    ,185,65,193,201,32,208,244,
    200,185,65,193,9      :REM*71
270 DATA 128,153,65,193,76,30,1
    93,96,165,251,208,3,32,20,1
    93,96,234,234         :REM*35
280 DATA 234,234,32,79,194,32,1
    03,194,32,139,194,32,91,194
    ,96,160,20,185       :REM*177
290 DATA 216,0,153,60,3,136,208
    ,247,96,160,20,185,60,3,153
    ,216,0,136,208        :REM*41
300 DATA 247,96,32,253,174,32,1
    58,173,32,247,183,165,20,13
    3,217,165,21,133     :REM*119
310 DATA 218,32,253,174,32,158,
    173,165,71,133,219,133,221,
    165,72,133,220       :REM*251
320 DATA 133,222,96,160,3,24,16
    5,221,101,217,133,221,165,2
    22,101,218,133        :REM*41
330 DATA 222,136,208,240,160,2,
    177,219,153,223,0,136,16,24
    8,160,0,177,224      :REM*101
340 DATA 153,10,195,200,196,223
    ,144,246,160,255,200,196,22
    3,176,43,185,10       :REM*69
350 DATA 195,201,32,208,244,200
    ,152,170,160,0,189,10,195,1
    45,224,232,200       :REM*187
360 DATA 228,223,144,245,169,32
    ,145,224,162,255,232,200,19
    6,223,240,8,189      :REM*119
370 DATA 10,195,145,224,76,215,
    194,165,220,197,222,144,14,
    240,3,76,9,195       :REM*155
380 DATA 165,219,197,221,144,3,
    76,9,195,24,165,219,105,3,1
    33,219,165,220       :REM*183
390 DATA 105,0,133,220,76,157,1
    94,96,82             :REM*137
```

Listing 2. Three-Way Switch demo.

```
10 POKE53281,1:PRINT"{SHFT CLR}
   {2 CRSR DNs}{CTRL 1}PLEASE W
   AIT!{2 SPACEs}READING DATA"
                        :REM*70
20 N=50:DIMN$(N):A$="ANYTHING"
                       :REM*156
30 FORX=0TON           :REM*106
35 READN$(X):NEXT      :REM*229
40 PRINT"{SHFT CLR}{2 CRSR DNs}
   HERE ARE THE NAMES":FORT=1TO
   2000:NEXT           :REM*178
50 FORX=0TON           :REM*126
60 PRINTX,N$(X)        :REM*184
70 IFPEEK(214)>19THENGOSUB500:P
   RINT"{SHFT CLR}{2 CRSR DNs}"
                        :REM*52
80 IFB$="{FUNCT 1}"THENX=N-15:B
   $=""                :REM*102
90 NEXT                :REM*100
100 GOSUB500            :REM*78
110 PRINT"{SHFT CLR}{2 CRSR DNs
    }NOW WE'LL SWITCH" :REM*152
120 PRINT"{2 CRSR DNs}ENTER LEN
    GTH";:INPUTL        :REM*26
130 POKE49411,L+1      :REM*120
140 FORX=0TON          :REM*216
150 SYS 49152,A$,N$(X)  :REM*60
160 PRINTX,A$          :REM*188
170 IFPEEK(214)>19THENGOSUB500:
    PRINT"{SHFT CLR}{2 CRSR DNs
    }":IFB$="{FUNCT 1}"THENX=N-
    15                 :REM*188
180 NEXT               :REM*190
190 GOSUB500           :REM*168
200 PRINT"{SHFT CLR}{2 CRSR DNs
    }NOW WE'LL CHANGE CASE":GOS
    UB500:PRINT"{SHFT CLR}{2 CR
    SR DNs}"            :REM*30
210 PRINT"{CTRL N}"    :REM*110
220 FORX=0TON           :REM*40
230 SYS 49159,A$,N$(X)  :REM*14
240 PRINTX,A$           :REM*12
250 IFPEEK(214)>19THENGOSUB500:
    PRINT"{SHFT CLR}{2 CRSR DNs
    }":IFB$="{FUNCT 1}"THENX=N-
    15                  :REM*12
260 NEXT                :REM*15
270 GOSUB500           :REM*249
280 PRINTCHR$(142)     :REM*183
290 PRINT"{SHFT CLR}{2 CRSR DNs
    }NOW WE'LL CHANGE THE WHOLE
     ARRAY":GOSUB500     :REM*7
300 PRINT"{SHFT CLR}{2 CRSR DNs
    }"                  :REM*87
310 SYS 49730,N,N$(0)  :REM*131
320 FORX=0TON          :REM*141
330 PRINTX,N$(X)       :REM*199
340 IFPEEK(214)>19THENGOSUB500:
    PRINT"{SHFT CLR}{2 CRSR DNs
    }":IFB$="{FUNCT 1}"THENX=N-
    15                 :REM*103
350 NEXT               :REM*105
360 GOSUB500            :REM*83
370 PRINT"{SHFT CLR}{2 CRSR DNs
    }NOW LOOK AT YOUR DATA STAT
    EMENTS"            :REM*159
380 PRINT"{2 CRSR DNs}YOU'LL SE
    E THEM SWITCHED":PRINT"{2 C
    RSR DNs}RUN THE PROGRAM AGA
    IN TO SWITCH BACK" :REM*239
390 GOSUB500           :REM*113
400 LIST1000-          :REM*117
500 POKE214,21:PRINT   :REM*177
510 IFA=0THENA=1:PRINT"{CTRL 9}
    ";:GOTO520         :REM*253
515 A=0                :REM*165
520 PRINT"{10 CRSR RTs}HIT ANY
    KEY TO CONTINUE"   :REM*246
530 FORT=1TO175:NEXT   :REM*110
540 GETB$:IFB$=""THEN500
                       :REM*172
550 RETURN              :REM*98
1000 DATAHOLUTA JACK,FISHER FRA
     NCIS,VANAUSDLE FRANK,POAST
      ROBERT,BEAL JIM    :REM*21
1010 DATAHAMILTON MICHAEL,HUFF
     JACK,AUER EDWARD,BOYER ALV
     IN,GLEISINGER JOSEPH
                         :REM*15
1020 DATAMCCLELLAN DAVID,GUERRA
      JOSE,DOPPS EUGENE,MCGREW
     HOMER               :REM*23
1030 DATAMCCAULLEY JAMES,GRAY D
     ORIAN,SHABBICK BARRY,LANDI
      DENNIS            :REM*204
1040 DATATHOMAS CHERI,SHOOK BRY
     AN,SALLEY JANIS,BURIOCK SH
     ERRY,MANCE TERRENCE
                        :REM*162
1050 DATAPOLENICK JOHN,GILLO RA
     YMOND,SUPER HELEN,MCTAVISH
      OSCAR,DANIEL RAYMOND
                         :REM*72
1060 DATASTILES DALE,SCHULTZ HA
     RRY,KOSOSKY THYOTHA,STEVEN
     S LOIS             :REM*124
1070 DATAWILLIAMS BILLY,SQUIRRE
     L ROCKY,MOOSE BULLWINKLE,R
     ONSON EDGAR          :REM*4
1080 DATAHUNNYCUTT ARTHUR,COCHR
     AN MICHAEL,TRISKA ROY,CARS
     ON JOHNNY          :REM*184
1090 DATAPETROFSKY MARVIN,MCGEE
      AMOS,BILLINGSLY BARBARA,T
     ODD HARVEY         :REM*250
1100 DATARANDOLPH BOOTS,ALBERTS
     ON RODNEY,THOMSON DELBERT,
     OTOOLE HIAKAWA      :REM*86
1110 DATAKOWALSKY NANOOK,HUNT C
     HARLES,GILBERT ROBERT
                        :REM*178
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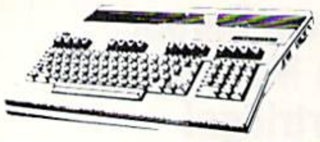

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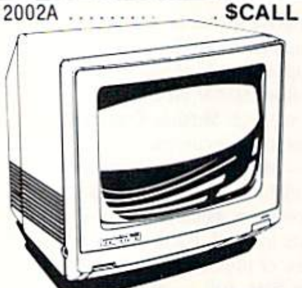

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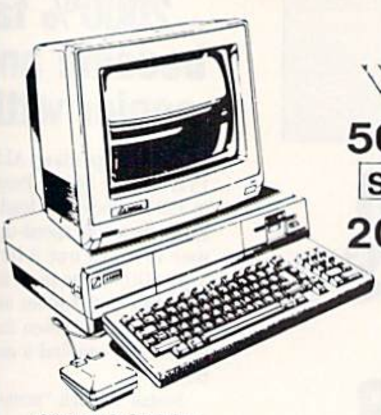

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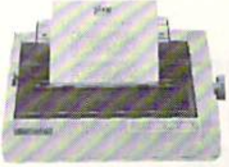

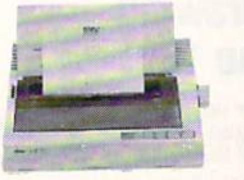

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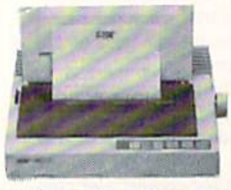

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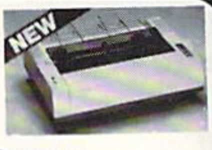

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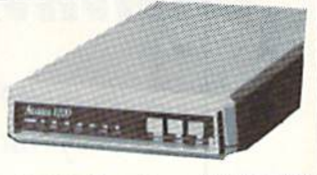

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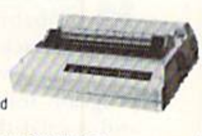

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COMMODORE CLINIC

Is video-tape data storage in the C-64/128's future? How can you print a quotation mark? These and other questions are answered in this month's column.

By JIM STRASMA

HARDWARE

Q *I've heard of a device that lets a standard VCR save programs on video tape in much the same way as a Datassette, storing up to 70MB of data. Are there any VCRs compatible with the 64C?*

—DAVID ROSENTHAL
APO, NY

A The device you heard about is probably the Corvus Mirror, a system that backs up the contents of a hard disk onto a video tape. It consists of a program for storing data on the tape and a card that's inserted into the expansion slot of a PC-compatible such as Commodore's PC-10. It can also make a backup automatically, without your having to start and stop the VCR yourself, *if* you have the proper brand and model of VCR.

I haven't heard of any tape backup units for the 64C yet, but one will probably become available once there are enough hard disks being used with the 64.

Q *Readers' comments on copy protection in the April Mail RUN sparked some fears in my mind. Could my software damage my 1571 disk drive? While some programs are loading, I hear a chattering noise inside the drive. Could this cause head misalignment, and, if so, can you recommend a word processor that doesn't do this?*

—WESLEY BIBRO
ALGONQUIN, IL

A Chattering noises during a program load are indeed usually due to copy-protection tricks employed by the manufacturer of the program. Such tricks often cause drive misalignment on the 1541, requiring a costly adjustment or an even more costly permanent fix. Fortunately, the 1571 has an added track 1 sensor, which largely eliminates the stresses that led to misalignment on the 1541.

Even so, there is no reliable substitute for backing up your important programs.

Two excellent and widely available word processors that are no longer copy-protected are PaperClip, from Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404), and WordPro 128/S, from Spinnaker (One Kendall Square, Cambridge, MA 02139).

Q *Help! After visiting a dozen computer stores and making over 59 long-distance phone calls, I haven't found a dealer locally or via mail order that supports the C-16. Some of the clerks even laughed at me for owning one!*

I'm prepared to spend $500 to $600 on programs and accessories for the C-16, but unless I find the equipment necessary to make my C-16 functional, I'll buy an Apple or IBM instead.

—DAVID MRUZ
MINNEAPOLIS, MN

A The best source of programs and accessories for the C-16 is Commodore itself (1200 Wilson Drive, West Chester, PA 19380), which has recently offered a variety of useful and entertaining programs for that computer at extremely low prices. Also, PLUG, the Plus/4 Users Group (PO Box 1001, Monterey, CA 93942), can help find programs for the C-16, since Plus/4 programs are compatible with it.

Six hundred dollars seems a bit much to invest in add-ons for it. For that price you can buy a C-64, all the accessories you need and several programs, and you'd probably be much happier with your purchase. The C-16 is best seen as a low-cost introduction to computing.

As for switching to Apple or IBM, you should be aware that they too have orphans. Those who purchased the Apple III and IBM PC jr are no happier today than you, and both IBM and Apple have recently upgraded their product lines in ways that eventually will force their customers to replace their current models.

Q *I regularly turn my 1541 disk drive off and on with the disk still in the drive. In my view, the equipment should have been designed to operate this way. Yet both you and my Emerald FSD-1 manual caution against this practice with near-religious fervor. I wish someone would clarify this point once and for all.*

—BEN JOHNSON
ADJUNTAS, PUERTO RICO

A I agree that the 1541 should be designed to work properly when switched off and on with a disk in place. Commodore knows how, having designed both its 8050 and 8250 drives properly in this regard. In all early 1541s, however, a serious problem can arise whenever power is lost with a disk in place.

When you cut off the power to your drive, the voltage that's used for save operations lingers longer than the voltage that's used to prevent a save operation from being executed. Thus, there is a small but real chance that erroneous data will be saved to your disk any time you switch off the power with the disk in place or if there's a power failure.

The simplest cure is to release the lever that loads the drive head so that the head is retracted from the disk. Then you won't need to actually remove the disk.

SOFTWARE

Q *Are there any C-64 programs for learning or playing bridge?*

—ALEX KAISER
CATHEDRAL CITY, CA

A The shortage of bridge game programs is somewhat surprising, considering that Personal Software's version of bridge for the original Commodore PET was one of the first polished games offered for that machine. Unfortunately, Personal Software is long since gone, but Artworx Software (150 North Main St., Fairport, NY 14450) is still around and offers two newer programs for teaching and playing bridge.

Bridge 4.0 is a well-regarded bridge simulation, in which you and a computer partner play against two computer opponents. It includes both bidding and the actual play. The computer also keeps score.

Artworx' other bridge program, Compubridge, is a tutorial and quiz program to help improve your play. Both Bridge 4.0 and Compubridge are available from mail order dealers.

Q *Is there an updated version of Easy Script? I need to do underlining and italics with my old Easy Script documents. Is there a word processor that will read my existing files, and can I transfer these to my PC-10?*

—J. B. ALSTON
DURHAM, NC

A Yes, there is an upgraded Easy Script available. Easy Script was developed for Commodore by Precision Software, which now sells an updated Superscript 64 and Superscript 128 through Progressive Peripherals & Software (464 Kalamath St., Denver, CO 80204). Both can read existing Easy Script files. As for underlining and italics, use a printer that has these features and is directly supported by Superscript, such as most Epson models.

If you want to send Easy Script files to the PC-10, use Easy Script's sequential file output option to resave them first; then send them to the PC-10 via a terminal program that can upload and download text files, such as CompuServe's Vidtex program. You'll also need a matching terminal program on the PC-10, like the IBM version of Vidtex.

Once you save your file on a PC-10 disk as a DOS text file, nearly any PC word processor can read them. I use Word Perfect 4.2 myself, but hundreds of other programs would also work.

Q *I used the Proof Reader and MLX programs to type in RUN Script 64 from the March 1986 issue of* RUN. *The checksums all checked out, but the program doesn't work. I checked RUN Amok for months, but it never mentioned any errors in the program. Were there any? I noticed in the May 1987 issue that there were some in the C-128 version.*

—ROBERT JOHNS
PORT HUENEME, CA

A RUN Script for the C-64 was correct as published—I use it to submit this column. On the other hand, even with the help of checksums, it can still be difficult to type in a large machine language program without making at least one error, especially the first few times you try.

One solution is to wait for such long programs to appear on a ReRUN disk. RUN Script, for example, is on the ReRUN Productivity Pak II disk, released in the fall of 1986. Another solution is to divide the typing chores among *RUN* subscribers or users group members in your area, with each person typing in only one or two programs a month. That way, you'll find it easier to remain alert to errors. But, if you have the time, the best solution is to learn to write and debug assembly language yourself.

Q *I'm planning on taking a computer programming course that introduces the Pascal programming language, and I need to know what software company sells the best Pascal for the C-128.*

—JUAN PEREZ
HIALEAH, FL

A The best Commodore-specific version I've tested on the C-128 is Super Pascal, from Abacus Software (PO Box 7219, Grand Rapids, MI 49510). It's also available for the C-64. Super Pascal includes both a text editor and compiler, and seems to have all the extras anyone could want.

However, Turbo Pascal, the compiler we use in our Pascal classes here at Western Illinois University, is supported by most new textbooks. It's from Borland International (4585 Scotts Valley Drive, Scotts Valley, CA 95056), and is available in a CP/M version that should be usable in CP/M mode on the C-128, and in an MS-DOS version for the PC-10.

PROGRAMMING

Q *I have a C-128 and would like to know how to find out how many bits I have left on a 1571 disk.*

—JOHN WANKOWITZ
CHICAGO, IL

A First, read the disk directory by entering the Directory command in C-128 mode. The very last line of the directory tells you how many blocks are free. Each block is made up of 256 bytes, of which 254 can be used for storing data, and each byte is made up of eight bits. Thus, we have a fairly simple double multiplication problem, easily solved by an Immediate mode calculation on the C-128 itself.

Let's say, for example, that the directory reports 511 blocks free. Our calculation then would be as follows:

```
? 511 * 256 * 8
```

and the answer, 1,046,528, appears as soon as we press the return key. If, instead, we want to know how many character spaces are left on the disk, our formula is

```
? 511 * 254
```

giving 129,794 as the number of usable bytes left on the disk.

Q *What is the meaning of the If statement in this line?*

```
15 IFPEEK(V+31)=.GOTO9
```

I don't understand what the decimal point after the equals sign means. No one I've asked knows, nor can I find it in any book.

—CHARLIE COGSWELL
PFLUGERVILLE, TX

A The lack of spaces in the line and substituting a decimal point for ►

RUN

BACK ISSUE UPDATE

Partial listing of articles in RUN's 1986 issues:

January—Couple your Commodore to a VCR or slide projector. Keyboard lo-res animation. Public domain CP/M software. RUN's terminal program, Runterm Plus, part 2. Software Buyer's Guide, part 2. New education column. And more.

February—The 1571 disk drive. Custom characters and 80-column Ultra Hi-Res Graphics on the C-128. On-line medical services. Rename disks. Tax help. And more.

March—C-128 productivity software. *RUN*'s own word processor, RUN Script 64. Accessing Commodore character sets. C-64 "numeric keypad." CP/M support from Commodore. New telecommunications column. New Basic programming series. And more.

SOLD OUT

April—Home-control software. RUN Script, part 2. Guide to CP/M software. Music editor. Auto-menu utilities for the 64 and 128. Change your 1541's device number. And more.

May—Printers and interfaces: what's available and how to choose. Print out Ultra Hi-Res graphics. One-on-one basketball game. Read and print out *any* file. Label Maker program. And more.

June—Introduction to GEOS. More on current printers. Redesign C-128 characters. Special section on education. File conversion and merge utilities. And more.

July—Commodore unveils new 64C family, 1581 disk drive and C-128 RAM expanders. Review of PaperClip II. *RUN*'s own electronic publishing software. And more.

August—Review of QuantumLink's Habitat. Disk Keeper program with nine disk utilities. Autoboot program. Career choice and career boost software. Custom characters on the C-64. New on-line Happenings column. RUNaway contest announced. And more.

September—Financial software, commercial and type-in. Quality screen shots. Turtle graphics for prereaders. RUN Basic 4.5. Create and print out signs. Notepad window. FSD-1 disk drive. CESnew product roundup. And more.

October—Small business and computer-aided-design software. Electronic ledger. Hi-res graphics without Peeks and Pokes. Interview with Commodore guru Jim Butterfield. New MegaMagic column. Puzzle program. And more.

November—Spreadsheets: how they work and programs on the market. *RUN*'s own spreadsheet, CalcAid 64. CP/M sampler. Using printer interfaces. Relocatable screen dump. Hi-res joystick graphics on the C-128. And more.

December—Text-and-graphics software. Laser printers. Illustration update to *RUN*'s electronic publishing software. RUN Script 128. Speech software. Gifts for computer users. Spartan I review. And more.

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a zero tells me that the programmer wanted to speed up program execution as much as possible. In a Comparison, or Assignment, statement, the decimal point is interpreted as the number zero, but more quickly than if it had been written in the usual way.

Because V is a constant in your program, you could speed up execution by defining another variable equal to V + 31 at the start of the program, since the current version needs to perform an unnecessary addition operation each time line 15 is executed. Something like

```
1 V=53248:W=V+31
15 IFPEEK(W)=.GOTO9
```

should run faster than the original version.

Q *How do I get my MPS-1000 to print out the execution of a program? I can get a listing, but not a copy of the run.*

—Shirley Gardner
Vergennes, VT

A For programs that get all data via Read or Input statements and display all results with Print statements, first use the following sequence of commands to generate a hard copy of the listing:

```
OPEN 4,4:CMD 4:LIST
```

then adjust the paper to the top of the next page and begin the program run with:

```
GOTO 100
```

where 100 is the first line number in your program. (Use this instead of the Run command.) Now your program should execute normally, except that all output will be redirected to the printer instead of the screen.

When your program ends, you'll need to type one more line to print the last line of output and direct output back to the screen:

```
PRINT#4:CLOSE 4
```

Q *Can you tell me how to put quotation marks within a Print statement on a C-64? I'm writing a story within a game, and it's difficult to read the text without them.*

—Michael Hall
De Soto, TX

A This is easier than you might expect. Simply replace the quotation marks with an equivalent character code, CHR$(34).

Thus, if you wanted a character in your story to say: "Hold it thar," said Sam, your Print statement would read as follows:

```
1000 PRINT CHR$(34);"HOLD IT
     THAR,";CHR$(34);" SAID SAM."
```

Since Commodore Basic defaults to semi-colon spacing, the semi-colons between the parts of the statement are not strictly necessary, but should be left in for compatibility with other Basics.

One problem is that, once a quotation mark has been printed, the system will be in Quote mode until either a second quotation mark or a carriage return is printed. In Quote mode, cursor control characters don't move the cursor, but instead show up as reversed characters.

You can switch off Quote mode on the screen, but not on a printer, by printing two quotation marks in a row, followed by a back-space character, entered as CHR$(8). This erases the unwanted second quotation mark and exits Quote mode.

You can also use CHR$( ) substitution to add other special characters, such as cursor controls to Print statements.

UPDATE

IN RESPONSE to your inquiry in the June 1987 issue about other ways for reader Al Colvin to address envelopes with Timeworks' Word Writer, I've found the following very effective.

After typing my letter, I force a page end, and change the left margin to 40. Then I use the Copy command to copy the intended address to this second page. Finally, I print the first page on regular paper, and the second page, the address, on the envelope.

—Jeanette Wilson
Salinas, CA

A Thanks for your help, Jeanette. Your solution should work on nearly any word processor. ■

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard to:

Jim Strasma
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GEOWATCH

Learn how geoCalc, Berkeley Softworks' spreadsheet member of the GEOS family, can simplify your budget-writing chores.

By MATTHEW STERN

Last month, I demonstrated how I used geoFile, Berkeley Softworks' new database program, to store and analyze information in my search for a new apartment. While it was important to find an apartment I liked, it was even more important to manage my finances so I found one I could afford.

In this month's column I'll show you how geoCalc, Berkeley's spreadsheet, helped me put together a monthly budget.

SPREADSHEETS MADE SIMPLE

If you're a frequent GEOS user, you already know how easy it is to use the system's "point and click" controls. If you've been frustrated by other spreadsheets' long, complicated commands and formulas, you'll find geoCalc refreshingly simple.

For example, geoCalc takes the effort out of entering formulas. With most spreadsheets, you have to memorize which cells you want to calculate, which function you want to calculate them with, and how to type the formula correctly. With geoCalc, you simply build formulas with your mouse, joystick or light pen. You select the desired math function with the Paste Function command from the Options menu, click on the cells you want to calculate, and press the return key. On other spreadsheets, you'd have to press three or four keys to perform the same operation.

Other spreadsheet functions can also be done with the mouse. Whereas most spreadsheets require four or five keystrokes to change the cell width, with geoCalc, you drag the cell's border to the desired position. To divide your display into two windows, each displaying a different part of your worksheet, you click on a "split-screen" icon and place it where you want the display divided.

On the other hand, if you prefer to keep your hands on the keyboard, as I do, geoCalc comes with Commodore key equivalents for most mouse-controlled operations. For example, all of the File menu options can be accomplished with keystrokes. Moreover, geoCalc has keyboard commands that are not displayed on the menus or dialog boxes, so check your manual for more information.

BALANCING YOUR BUDGET

Writing a budget is very simple. You add up your income, subtract your monthly payments and expenses, and what's left over is your discretionary income. If only it were that easy to live within your budget.

To start your budget, you jot down the titles for your different income and expense amounts. Your budget categories (such as net salary, car payments and groceries) would go down the page. If you are breaking down your budget by months, you list these across the page. You now have a grid into which you enter your budget amounts.

GeoCalc has several tools to make writing titles easy. To enter text, you type it into an editing box above the worksheet. Once that's done, press return to move down to the next cell, or control/I (the GEOS 64 tab key) to move across. (Holding down the Commodore key while pressing return or control/I moves you in the opposite direction.) If you make a mistake, click on the cell in question to bring the text into the editing box, where you may change or erase it. Be aware that to move the cursor in the editing box, you must place it with the mouse. The cursor keys scroll the worksheet.

You can also use different typestyles to emphasize your titles. On my spreadsheet, I used bold type for major budget category headings (such as Income and Monthly Payments) and italics for totals. GeoCalc only changes the style of *existing* text, however, so you must type in all your titles first, then change their styles. Only one font is available: the system font, BSW.

Entering numbers is just as easy, and, just as with text, you can set numbers in different typestyles. You may also choose a variety of number formats, including dollar signs, commas and scientific notation, by selecting Format from the Display menu. For my budget amounts, I selected a dollar sign format, with commas and no numbers after the decimal.

If I have the same monthly car loan and credit card payments month after month, I prefer to copy them, rather than retyping, and geoCalc has the same Cut, Copy and Paste commands as other GEOS applications. When cells are cut or copied, they're saved as a scrap file that you can paste into another geoCalc spreadsheet, and with the Copy Text Scrap command option, you can transfer cells to geoWrite, geoFile and other programs that read text scraps.

One amount I didn't enter into my budget was rent, because I wanted to take the rent amounts I'd stored in my geoFile database and plug them into the budget to see which apartment was the most affordable. I'll show you how I did this a little later on.

FORMULATING ANSWERS

As I mentioned above, it's easy to build formulas with geoCalc. You select the function from the menu and click on the cells you want to calculate. Of course, you do have the option of typing in the formulas yourself. For example, I put my income amounts in cells D4 through D8. To get their total, I entered in cell D9:

```
=SUM(D4:D8)
```

The Copy and Paste commands come in handy when you want to use the same formula each month. Of course, the cell references change when you paste a formula into another column. When I pasted the above formula into column E, it became

```
=SUM(E4:E8)
```

If you insert dollar signs into a cell reference, however, the reference won't change when you paste a formula into another column. For example, suppose I wanted to use the total in cell D9 elsewhere in the spreadsheet. I'd enter:

```
=SUM($D$4:$D$8)
```

Rather than trying to remember their cell references or formulas, you can create descriptive names for cells by using ►

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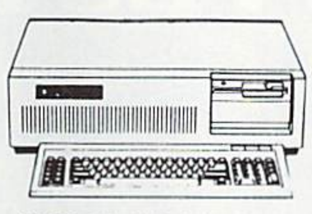

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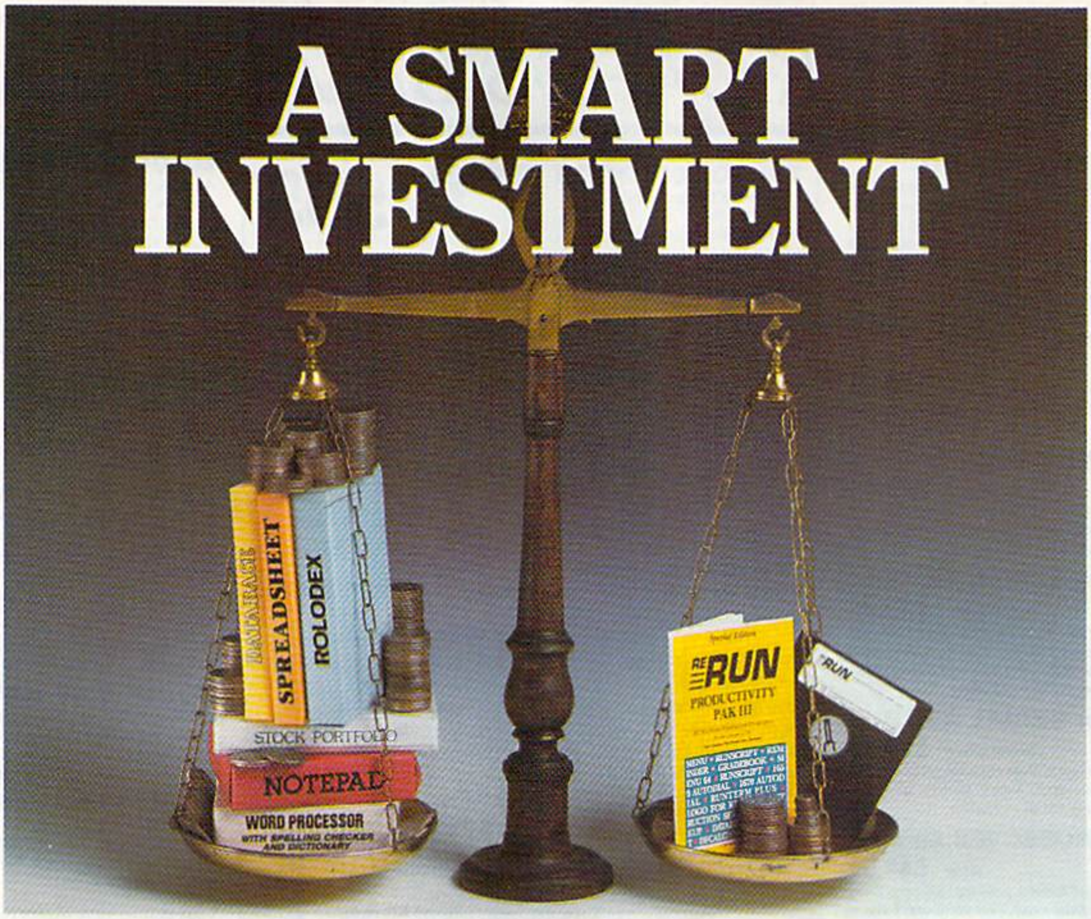

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the Define Name selection in the Options menu. The only restriction is that the name contain no spaces. In my budget, I had formulas for figuring totals for income, monthly payments, home, living and miscellaneous expenses. I named these items, using the underline character (Commodore key/ –) to fill any spaces between two-word names. Then, when it was time to total my expenses, I used the cell names in my formula, rather than the cell references.

EXCHANGING INFORMATION

As useful as geoCalc's features are by themselves, they become even more impressive when using information from other programs. The purpose of my budget was to find which apartment was the most affordable for me. My apartment information was in geoFile and my budget was in geoCalc, but fortunately, it isn't hard to bring the two together.

I first ran a search in geoFile for the apartments under consideration. Then, with the Build Scrap command in the File menu, I created a text scrap file. In geoCalc, I pasted that scrap with the Paste Text Scrap option, and the program arranged the fields in columns, with the field names on the top line and the data below. This command can also read text scraps created by other programs.

I experimented with my geoFile information in several ways. I first wanted to find out which apartment had the lowest rent. For this, I used geoCalc's MIN function, which looks for the lowest number in a range. To find the lowest rent, I entered:

```
=MIN(J50:J60)
```

I gave the cell the name Low_Rent and pasted it into my budget worksheet. The totals recalculated automatically and showed me how my financial situation would be. Next, I assigned all the utility amounts a name and pasted them, one at a time, into the budget. Of course, there's more to selecting an apartment than just the rent and utility costs, but this process was helpful and quick in determining a very important element.

Spreadsheets are useful for this type of modeling, and geoCalc especially makes this type of number management easy by making it more intuitive. You can concentrate on working with the figures without being distracted by trying to remember cell designations, and with GEOS's ability to transfer information between GEOS programs with scrap files, you have great flexibility at hand.

I hope you've found this and last month's tutorials helpful. I'll put these sample files on Q-Link, so you can download and experiment with them. Check the Q-Link GEOS Forum for details.

COMING NEXT MONTH

We've seen how GEOS handles art, information and numbers. So what else can it do? Next month, I'll show you how GEOS can help educate children. Keep watching. ■

The monthly geoWatch column addresses the needs of RUN *readers who use GEOS, Berkeley Softworks' alternative operating system for the C-64 and C-128. Your questions and comments are welcome. Send them to:*

Matthew Stern
geoWatch
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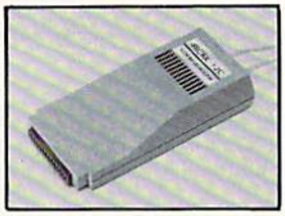

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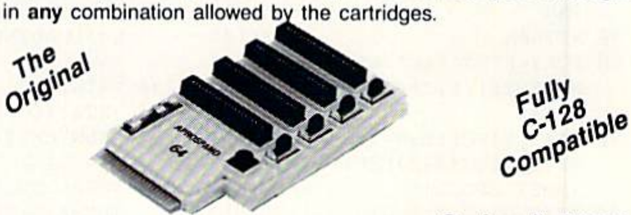

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EASY APPLICATIONS

FIFTEEN PUZZLE: Use your 1351 mouse to solve this classic sliding-block puzzle.

By MIKE BUCKLEY

If you're always itching for a new challenge, you'll want to sit right down and type in Fifteen, my mouse-driven C-64 version of Sam Loyd's famous sliding-block puzzle. Later, after you've solved the puzzle a few times, you'll have fun giving it a special twist and trying it on unsuspecting friends and relatives.

When you run Fifteen, two arrays appear on the screen, each consisting of 16 blocks arranged in four rows and four columns. Fifteen of the blocks are numbered, 1–15, and the other one is blank.

The small array on the right is the "target," with the numbers appearing in proper numerical order. In the large array on the left, the numbers are scrambled. The object of the game is to "slide" the blocks in the scrambled array up and down and left and right until

Listing 1. Fifteen program.

```
10 PRINT"{SHFT CLR}{CTRL 8}{CTR
   L 9}=*={9 SPACEs}THE "CHR$(3
   4)"15-PUZZLE"CHR$(34)"{10 SP
   ACEs}=*=":RUN230       :REM*226
20 F=.:FORY=4TO1STEP-1:FORX=4TO
   1STEP-1:IFA$(X,Y)<>T$(X,Y)TH
   ENF=1:X=1:Y=1          :REM*194
30 NEXT:NEXT:IFF=.THENL=1
                          :REM*208
40 IFM>1THENPRINTLEFT$(Y$,15)LE
   FT$(X$,20)STR$(M)" MOVES SO
   FAR                    :REM*126
50 RETURN                 :REM*108
60 FORY=RTOJ-1:C$=A$(I,Y+1):PRI
   NTLEFT$(Y$,Y*4+2)LEFT$(X$,I*
   4)C$                   :REM*190
70 A$(I,Y)=C$:M=M+1:NEXT:PRINTL
   EFT$(Y$,J*4+2)LEFT$(X$,I*4)"
   {SHFT SPACE}"          :REM*212
80 A$(I,J)=" ":R=J:J=J-1:GOSUB2
   0:RETURN                :REM*54
90 FORX=CTOI+1STEP-1:C$=A$(X-1,
   J):PRINTLEFT$(Y$,J*4+2)LEFT$
   (X$,X*4)C$              :REM*70
100 A$(X,J)=C$:M=M+1:NEXT:PRINT
    LEFT$(Y$,J*4+2)LEFT$(X$,I*4
    )"{SHFT SPACE}"        :REM*78
110 A$(I,J)=" ":C=I:I=I+1:GOSUB
    20:RETURN              :REM*92
120 FORX=CTOI-1:C$=A$(X+1,J):PR
    INTLEFT$(Y$,J*4+2)LEFT$(X$,
    X*4)C$                :REM*252
130 A$(X,J)=C$:M=M+1:NEXT:PRINT
    LEFT$(Y$,J*4+2)LEFT$(X$,I*4
    )"{SHFT SPACE}"       :REM*108
140 A$(I,J)=" ":C=I:I=I-1:GOSUB
    20:RETURN             :REM*154
150 FORY=RTOJ+1STEP-1:C$=A$(I,Y
    -1):PRINTLEFT$(Y$,Y*4+2)LEF
    T$(X$,I*4)C$          :REM*234
160 A$(I,Y)=C$:M=M+1:NEXT:PRINT
    LEFT$(Y$,J*4+2)LEFT$(X$,I*4
    )"{SHFT SPACE}"        :REM*46
170 A$(I,J)=" ":R=J:J=J+1:GOSUB
    20:RETURN             :REM*112
180 IFI=CTHENIFJ<RTHENGOSUB150:
    RETURN                :REM*102
190 IFJ=RTHENIFI>CTHENGOSUB120:
    RETURN                 :REM*88
200 IFJ=RTHENIFI<CTHENGOSUB90:R
    ETURN                  :REM*36
210 IFI=CTHENIFJ>RTHENGOSUB60
                          :REM*110
220 RETURN                 :REM*22
230 Y$="{HOME}{22 CRSR DNs}":X$
    ="{29 CRSR RTs}       :REM*128
240 PRINTY$"{CTRL 9}=*={11 SPAC
    Es}LOADING DATA{11 SPACEs}=
    *=                    :REM*170
250 PRINTY$"{2 CRSR DNs}{2 CRSR
     RTs}{COMD 3}FROM "CHR$(34)
    "RUN"CHR$(34)" MAGAZINE ---
    -------- 1987";       :REM*188
260 FORA=.TO53287:READN:IFN>255
    THENA=N:READN         :REM*157
270 POKEA,N:NEXT:SYS49408:PRINT
    "{HOME}{3 CRSR DNs}"X$"{COM
    D A}{SHFT *}{COMD R}{SHFT *
    }{COMD R}{SHFT *}{COMD R}{S
    HFT *}{COMD S}"       :REM*117
280 FORJ=1TO4:PRINTX$"{SHFT -}
    {SHFT -} {SHFT -} {SHFT -}
    {SHFT -}":IFJ<4THENPRINTX$"
    {COMD Q}{SHFT *}{SHFT +}{SH
    FT *}{SHFT +}{SHFT *}{SHFT
    +}{SHFT *}{COMD W}     :REM*11
290 NEXT:PRINTX$"{COMD Z}{SHFT
    *}{COMD E}{SHFT *}{COMD E}{
    SHFT *}{COMD E}{SHFT *}{COM
    D X}{CTRL 8}":X$=X$+"{8 CRS
    R RTs}                :REM*247
300 PRINT"{HOME}{4 CRSR DNs}{21
     CRSR RTs}TARGET:     :REM*213
310 DIMA$(4,4),T$(4,4):T$="1234
    56789ABCDEF ":A$=T$:REM*177
320 FORY=1TO4:FORX=1TO4:Z=Z+1:C
    $=MID$(T$,Z,1):T$(X,Y)=C$
                          :REM*193
330 PRINTLEFT$(Y$,Y*2+3)LEFT$(X
    $,X*2+28)C$:NEXT:NEXT:H=327
    67:B=H:FORG=1TOH      :REM*101
340 PRINTY$"{CTRL 9}=*={12 SPAC
    Es}SCRAMBLING{12 SPACEs}=*=
                           :REM*93
350 PRINT"{HOME}{3 CRSR DNs}{2
    CRSR RTs}{CTRL 1}{COMD A}{3
     SHFT *s}{COMD R}{3 SHFT *s
    }{COMD R}{3 SHFT *s}{COMD R
    }{3 SHFT *s}{COMD S}:REM*11
360 FORJ=1TO4:FORI=1TO3:PRINT"{
    2 CRSR RTs}{SHFT -}{3 SPACE
    s}{SHFT -}{3 SPACEs}{SHFT -
    }{3 SPACEs}{SHFT -}{3 SPACE
    s}{SHFT -}":NEXT       :REM*67
370 IFJ<4THENPRINT"{2 CRSR RTs}
    {COMD Q}{3 SHFT *s}{SHFT +}
    {3 SHFT *s}{SHFT +}{3 SHFT
    *s}{SHFT +}{3 SHFT *s}{COMD
     W}                    :REM*37
380 NEXT:PRINT"{2 CRSR RTs}{COM
    D Z}{3 SHFT *s}{COMD E}{3 S
    HFT *s}{COMD E}{3 SHFT *s}{
    COMD E}{3 SHFT *s}{COMD X}{
    CTRL 8}                 :REM*9
390 FORL=1TO62:Z=INT(RND(.)*14)
    +2                    :REM*123
400 A$=MID$(A$,Z,1)+MID$(A$,2,Z
    -2)+LEFT$(A$,1)+RIGHT$(A$,1
    6-Z):NEXT              :REM*73
410 Z=.:M=.:FORY=1TO4:FORX=1TO4
    :Z=Z+1:C$=MID$(A$,Z,1)
                           :REM*45
420 PRINTLEFT$(Y$,Y*4+2)LEFT$(X
    $,X*4)C$:IFC$=" "THENC=X:R=
    Y                      :REM*19
430 A$(X,Y)=C$:NEXT:NEXT:PRINTY
    $"{CTRL 9}=*={7 SPACEs}POIN
    T AND CLICK LEFT{7 SPACEs}=
    *=                     :REM*93
440 FORL=.TO1STEP.:WAIT56321,16
    ,16:I=INT((PEEK(53248)+PEEK
    (53264)*256-12)/32):REM*123
450 IFI<1ORI>4THENNEXT     :REM*57
460 J=INT((PEEK(53249)-46)/32):
    IFJ<1ORJ>4THENNEXT    :REM*109
```

they're in the same order as in the target array, and to move as few blocks as possible in the process. Each time you move a block, your score increases.

Here's how to play. Move the mouse so the arrow points to any number in the scrambled array that's in the same row or column as the empty space. Then click the left joystick button, and the number will slide toward the space, shoving any numbers in between with it. The empty space will end up under the pointer.

```
470 GOSUB180:NEXT:IFM<BTHENB=M
                          :REM*103
480 PRINTY$"{CTRL 2}{CTRL 9} CL
    ICK LEFT TO REPLAY, OR RIGH
    T TO QUIT {CTRL 8}  :REM*81
490 FORL=.TO1STEP.:N=PEEK(56321
    ):IFN=254THENPOKE53269,.:LO
    AD"MENU",8          :REM*183
500 L=-(N=239):NEXT:PRINTLEFT$(
    Y$,18)LEFT$(X$,21)"BEST ="S
    TR$(B)" MOVES{2 SPACEs}"
                          :REM*47
510 PRINTLEFT$(Y$,15)LEFT$(X$,2
    0)"{19 SPACEs}":NEXT:REM*85
520 DATA 896,252,,,248,,,240,,,
    248,,,220,,,142,,,7,,,3,,,,
    ,,,,,,,,,,,,,,,       :REM*14
530 DATA,,,,,,,,,,,,,,,,,,,,,,,
    2040,14             :REM*222
540 DATA 49408,173,21,3,201,193
    ,240,25,8,120,173,20,3,141,
    ,192,173,21,3,141,1:REM*194
550 DATA 192,169,33,141,20,3,16
    9,193,141,21,3,40,96,216,17
    3,25,212,172,2,192  :REM*38
560 DATA 32,88,193,140,2,192,24
    ,109,,208,141,,208,138,105,
    ,41,1,77,16         :REM*132
570 DATA 208,141,16,208,173,26,
    212,172,3,192,32,88,193,140
    ,3,192,56,73,255,109
                          :REM*236
580 DATA 1,208,141,1,208,108,,1
    92,140,5,192,141,4,192,162,
    ,56,237,5,192       :REM*250
590 DATA 41,127,201,64,176,7,74
    ,240,18,172,4,192,96,9,192,
    201,255,240,8,56    :REM*204
600 DATA 106,162,255,172,4,192,
    96,169,,96          :REM*164
610 DATA 53248,152,186,53264,,5
    3269,1,53280,13,8,53287,1
                          :REM*150
```

Keep moving numbers until the two arrays are alike, at which point the game is over. You can slide as many as three numbers with one click, but try to move as few as possible, because your score will increase by one for each number you move. Your current score and your best (lowest) previous score are displayed as you work. When you've finished the puzzle, you can click the left button to play again or the right button to quit.

Fifteen is written in Basic, with a machine language subroutine to take care of the mouse and its pointer. The machine language code and sprite parameters are poked into memory from Data statements, so heed the usual warning about saving the program before running it.

LOYD'S HOAX

With the program as written, each game starts with a different scrambled array, and each puzzle is solvable. However, if you change line 390 so it reads FORL = GTO62 instead of FORL = 1TO62, the first puzzle will be solvable and the second will be impossible.

Demonstrate Fifteen to a friend, then play the first game and challenge him or her to get a better score on the second. No matter how high (poor) your score is, your friend won't be able to beat it!

If this seems unfair, consider the historical precedent. Around 1872, Sam Loyd, the great American puzzlist, drove the country crazy with his Fourteen-Fifteen puzzle. The antecedent to mine, it also was a square box containing 15 numbered blocks and one blank. The numbered blocks were in numerical order except for the 14 and 15, which were reversed. The object was to slide the blocks around to reach a configuration similar to the initial one, but with the 14 and 15 in proper sequence. The craze died down when mathematicians proved that the task was impossible.

To use a simpler example, consider a smaller box, with only three numbered blocks. The 24 possible arrangements of the blocks fall into two distinct sets: one in which the numbers run clockwise and one in which they run counterclockwise. It's evident that you can't get from one set to the other without taking the blocks out of the box. In fact, you can't get from one configuration to another if they differ by an interchange of two blocks or any odd number of such exchanges. Loyd's puzzle, although it has almost 21 trillion possible arrangements of the blocks, falls in this category.

An even number of swaps maintains the "parity" of the configuration. In my program, the 62 switches performed in lines 390–400 guarantee not only a solution, but a better-than-50-percent chance that no number in the scrambled array will start off in its target position. The programming change I suggested results in only 61 switches, making the second puzzle unsolvable.

PLAY THIS GAME NOW

If you're the kind of person who likes to tackle six impossible jobs before breakfast, consider this puzzle array:

```
P L A Y
T H I S
G A M E
N W O
```

The previous discussion would suggest that it's hopeless to try to correct the transposition in the bottom line. If you make the following changes to the program, they will enable you to research the matter:

```
310 DIMA$(4,4),T$(4,4):T$ =
    "PLAYTHISGAMENOW "
390 :
400 A$ = "PLAYTHISGAMENWO "
```

If you do achieve the impossible, write to me care of *RUN* and let me know how many moves it took and what they were. ■

Learn To Walk Before You RUN

We receive many letters from new Commodore owners who want to type in program listings from *RUN* and need help in getting started. To answer many of the questions novice users have, we present the following guidelines.

1. First, keep in mind that as a beginner you should enter only short Basic programs. Avoid machine language listings and lengthy Basic programs until you get the hang of what you're doing.

2. To help you catch mistakes in typing in listings, we publish two checksum programs each month, called 64 Perfect Typist and 128 Perfect Typist. (Follow the directions in How To Type *RUN* Listings, elsewhere in this issue.)

3. If you intend to save the program you're typing in on a brand new disk, you must format that disk. To do this, insert the disk in your drive and type:

```
OPEN15,8,15 <press return>
PRINT#15,"N0:NAME,##" <press return>
```

The ## is a two-character identifier that can be any combination of letters or digits. NAME can be any title for the disk that you choose, as long as it's 16 characters or less.

After entering the above lines, wait for a few minutes while the disk spins inside the drive. When the disk stops, the formatting is done. Then type:

```
CLOSE15 <press return>
```

In 128 mode on a C-128, you can shorten this procedure by typing:

```
HEADER "NAME,##" <press return>
```

Caution: The formatting process erases any material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to keep. See item 11 below, on reading the disk directory, if you need to find out what's on the disk.

4. Before you start typing in a program listing, your computer's memory needs to be empty. To make sure it is, turn the computer off, wait a few seconds, and turn it on again.

5. As you type in the listing, remember to press the return key after each line. The return enters the line into memory.

6. If you want to review what you've entered, type LIST and press the return key; all the lines you've entered will scroll by. You can slow the scrolling on the C-64 by holding down the control key, and on the C-128 by pressing the no scroll key. To view certain specific lines, type LIST, followed by the line numbers you want; then press the return key. For example, LIST 10–50 displays lines 10 through 50, and LIST 20 displays only line 20.

7. If you find an error in a line, delete the incorrect characters with the insert-delete key, then retype that portion and press return to enter the new line in memory.

8. Be sure to save the program to disk fairly often during the typing process. Otherwise, you could lose all your work if a power glitch wipes out your computer's memory. To save a partial or complete Basic program listing, type:

```
SAVE "NAME",8 <press return>
```

In 128 mode on a C-128, you can press F5, type in NAME and press the return key. Here, NAME is the filename you want the program to have, not the disk name you used when formatting.

Each time you save a revised program to the same disk, you must change its filename, or a disk error will occur, even if only one character is changed. An easy way to vary the filename is by adding version numbers to the end of the basic name (Program.1 and Program.2, for example). The numbers will also tell you which version is the latest.

9. If you wish to erase (scratch) unwanted programs from a disk, type:

```
OPEN15,8,15 <press return>
PRINT#15,"S0:filename" <press return and wait a few seconds>
CLOSE15 <press return>
```

In 128 mode on a C-128, you can type:

```
SCRATCH "NAME" <press return>
```

Be sure not to erase the final version!

10. Always save the final version of a program to two disks, so you have a backup copy in case one of the disks gets damaged. When saving to two different disks, you can use the same program name in each case.

11. To view a complete list of the filenames on a disk (i.e., read the disk directory), type:

```
LOAD "$",8 <press return>
LIST
```

In 128 mode on a C-128, you can just press F3.

12. When you know what program you want to load, next make sure you know *exactly* how its filename is spelled in the disk directory, including punctuation, special characters and spaces. A mistake in the filename will keep the load from working.

If the disk directory is still on the screen when you enter the Load command, you can refer to that for the spelling. If the directory will be gone from the screen by the time you enter the Load command, jot down the exact spelling of the filename for reference. Once you're sure of the filename, load the program by typing:

```
LOAD "NAME",8 <press return>
```

In 128 mode on a C-128, you can just press F2, type in the filename and press the return key.

13. After you've loaded the program, enter RUN to use it. ■

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TELECOMPUTING WORKSHOP

This month: there's a proposed rate hike you'll want to write to the FCC about; David Bradley announces his new BBS phone number; and more.

By DAVID BRADLEY

I will devote the first bit of this column to a Federal Communications Commission proposal that, if passed, will affect almost everybody who uses a modem. If you use QuantumLink, CompuServe, GEnie, American PeopleLink, Mnematics, Protocall, Delphi, or any other on-line service accessed via Tymnet or Telenet, beware! The FCC is considering changing the rules by which these services operate. According to the proposal, companies that offer data transmission services through local telephone loops will be charged special access fees, much like the fees long-distance voice communications companies like MCI and Sprint must pay. Income from the new fees, scheduled to take effect January 1, 1988, will go to the local carriers to cover the cost of access facilities.

Since the AT&T breakup, local telephone access numbers that provide interstate public data exchange have been considered "enhanced services" and have been exempt from such special charges. The FCC says this exemption was designed to maintain market stability during the breakup.

The proposal will affect commercial data services, but not private networks. If it goes through, access to on-line services such as the ones I mentioned will cost anywhere from $2–$5 more per hour, making them too expensive for most users to afford. *Washington Post* computer columnist Michael Schrage protests, "If the FCC proposed a rule that would double the data communications costs of the Fortune 500 companies with private networks, it would face so much political heat that it would break its legs backpeddling."

I encourage you to write to the FCC to object to the proposal. You must write as an individual, because group responses won't do much good. When you write, place docket number 87-215 near the heading of the letter, then include in the body of the letter your opinion, along with who you are, what you do, what your interest in this proposal is and any related facts, experiences and insights. Be brief and explicit, including only information that's essential to the issues involved. However, don't send just a postcard or note saying you're against the proposal. The FCC wants to know why.

When I wrote, I mentioned that if it weren't for these reasonably priced services, I wouldn't have met my wife, Jane. I also pointed out things such as the educational aspects of telecomputing.

Believe it or not, you must send 14 copies of your letter. The FCC has specific rules governing comment on such "notices of proposed rule-making," and they call for that many copies.

Please do your bit and write to the FCC. The address is: Secretary, Federal Communications Commission, 1919 M St. NW, Washington, DC 20554. Also send copies of your letter to your senator and congressman, and a phone call to them won't hurt, either.

Now, on to other things . . .

—If you've been looking for the new Florida number for my BBS, I finally have it. When you get this magazine, the board may not be up to its old Toronto self yet, but I'll have something on, and more will be coming. The number is 813-377-5941.

—If you, your business or your user's group offers public domain or shareware telecommunications programs to use with the C-64, the C-128 or the Plus/4, I'd like to hear about it. I'm compiling a list of sources of such programs to include in a future column. Send me the name of the program and a description of its features and the equipment it works with; the name and address for people to write to; how much you charge and what the turn-around time is on an order.

—Responses to the survey that I announced in the June issue are pouring in, and some of the things I'm hearing are interesting indeed. I'll report on them in a future column. Meanwhile, if you haven't written, I'm looking for information on what equipment and software you use for telecommunications, what BBSs and networks you access, what you like about them and anything else you think to mention. This information will help me answer reader questions more accurately and thoroughly.

—If you have a C-64 and like to fix it yourself, be sure to go to your local Radio Shack and pick up a Commodore 16 keyboard for $4.95. The keys aren't the same color as the 64's, but if you break a key or need a new spring or other keyboard part, this keyboard will be a lifesaver.

—John D. Larkin has written to say that for his Commodore 1670 modem to work, if there are any devices on the serial bus, at least one of them must be turned on. If none are on, the modem dials, beeps and insists that it's connected, but it isn't.

—Plus/4 owners looking for a VT100 emulator as well as a great terminal program should contact Dennis Larson, 11982 Xeon St. NW, Coon Rapids, MN 55433. He's copyrighted a machine language program that supports the Commodore 1660 and 1670 modems, and he sells it for $22.50. If you'd like to meet with Dennis online, you can attend the Plus/4 conference he hosts on PeopleLink every Sunday at 9 PM, Central time.

—Robert L. Smith wrote in response to Raymond J. Clare's letter in last June's column about exchanging data at 2400 baud between his C-64 and his Tandy 600. Robert has been doing this sort of thing for two years and has found that on his system 2400 baud produces nearly 50 percent checksum errors, making transmission slower than even 1200 baud. He suggests that Raymond stick to 1200.

—Shane,Oakely of Prestige International, PO Box 23397, Lexington, KY 40523, has informed me that the C-Net BBS program (version 12 for the 64, version 2.5 for the 128) will work with Xetec's Lt. Kernal and ICT's Data Chief hard disk drives. Richard Wills was asking about this in July.

Now for this month's questions:

Q *I run a BBS and have gotten my mom really into telecomputing. The problem is, she calls* all *the local BBSs, using my BBS* *terminal, and she's tying up my computer. Can you suggest a low-cost Commodore computer she could use? I hear the Plus/4 is a good machine, but I haven't seen a modem or software for it. She isn't into up- and downloading; she just needs something she can call out on.*

—SCOTT TOWNSEND
HEALDSBURG, CA

A It's nice to see family members sharing the computer experience, but it can lead to problems. Your situation sounds like what happens with TVs. The family has one, everybody wants to watch something different, so eventually another TV appears to calm the waters.

If all your mother needs is a terminal, you could go with the Plus/4, a Commodore 1660 or 1670 modem and a public domain Plus/4 terminal program called Higgyterm. Another route you might investigate is a VIC-20 with a 16K RAM expander, a Commodore 1650-compatible modem and a public domain 40-column terminal program called NewPunter 16k.v.

Q *Is there a way to make the Commodore 1670 1200-baud modem autodial?*

—BEN KASPER
GRAND RAPIDS, MI

A I wrote a Basic program for *RUN*'s ReRUN Productivity Pak II disk that tells the 1670 to autodial and then to load and execute the Runterm Plus terminal program (from the same disk) when it makes a connection. If you get the disk, you should be able to modify the program easily for your purposes. For information on ordering the Productivity Pak II disk, call 800-258-5473 (924-9471 in New Hampshire).

You could also use the following simple program to make the 1670 autodial:

```
10 OPEN 2,2,0,CHR$(6) + CHR$(0)
20 PRINT#2,"ATV0"
30 PRINT"INPUT NUMBER TO
   AUTODIAL ";
40 INPUT NU$
50 PRINT#2,"ATDP";NU$
60 GET#2,A$
70 WA = WA + 1
80 IFWA>2500THENPRINT"NO
   CARRIER":WA = 0:GOTO50
90 IFA$ = ""THEN60
100 IFA$ = CHR$(102)ORA$ = CHR$(179)
    THENFORI = 1TO5000:GET#2,AA$:
    NEXT:WA = 0:GOTO50
110 IFA$ = CHR$(177)ORA$ = CHR$(98)
    THENPRINT "CONNECT! WHAT DO
    I DO NOW?":CLOSE2
```

Q *I own a C-128 and a Taihaho 300-baud modem. The modem came with software that will up- and download only under the Punter protocol. Is there a program available that supports the Xmodem protocol and my modem?*

—STEVE STEGALL
MT. PLEASANT, NC

A Two excellent public domain terminal programs, Multi-Term and UltraTerm, will do what you're looking for in 80-Column 128 mode.

Q *I want to run a BBS on my C-128 in 128 mode, and I need a program for it. Can you suggest one?*

Also, I've had terrible luck with the 1670 modem from Commodore. The first one died after I'd used it just twice. I sent it back to Commodore, and 45 days later a replacement arrived, but it didn't work either. My other modems work fine with my computer, and I tried the second 1670 on a number of other computers, and it didn't work. Is this normal for the 1670?

—ILEY A. PULLEN, JR.
NORTH CAROLINA

A As far as C-128 BBS programs go, a public domain program that seems to be popular is called EBBS. The commercial program called C-Net that I mentioned earlier might also meet your needs.

Your troubles with the 1670 sound far from normal. I've been using one for about two years and have had no trouble at all. With every product there are always a few defective units, and it sounds like you got two of them. If you tried a third, my guess is it would be okay.

Q *Is the Volksmodem 6420 compatible with the Plus/4?*

—WILLIAM J. KELLER, JR.
PITTSBURGH, PA

A No, but like the Commodore 1660 modem, you might be able to modify it to work with the Plus/4. The Commodore 1670 will work with a Plus/4 at the flip of a DIP switch.

Q *I've been trying to get a company to sponsor my BBS and pay for the 800 number, but none of them are game. I was going to give them their own section for company updates, sale and new product announcements, and so forth, but that doesn't seem to be enough. Do you know of a company that would be interested?*

—DIRK MUITS
VENTNOR, NJ

A I think you'd find companies more willing if you didn't want them to pay for an 800 number, especially when just one of the many sections on the BBS would be dedicated to them. An 800 number on a BBS can cost thousands of dollars, and unless you convince them they're going to generate enough business to pay that phone bill, they're not going to go for it. ■

Telecomputing Workshop is a monthly column dedicated to the needs of RUN *readers who are using, or intend to use, a Commodore computer for telecommunications. We invite you to submit your questions and comments to:*

David Bradley
Telecomputing Workshop
c/o RUN Magazine
80 Elm St.
Peterborough, NH 03458

RESOURCE CENTER

This month: the nation's schools are gearing up for Computer Learning Month, and a teacher shares a program he wrote.

By MARGARET MORABITO

October has been designated National Computer Learning Month by the U.S. Congress. During this month, education and computer industry leaders will focus on encouraging students, teachers and parents to explore computers as tools for learning in the home and in the school. This type of focus is nothing new for many readers of the Resource Center, but it's significant to see a national movement to promote awareness of computers in education.

Here are some of the activities that will occur during this month-long event. Perhaps you can get involved in your hometown.

NATIONAL CONTESTS

The month will be highlighted by five national contests that are open to students and teachers in grades K–12, with participants classified according to primary, middle and secondary level. The prizes will include Apple IIGS computer systems (where are you, Commodore?) and educational software; certificates of participation will also be awarded. Entries must be received by the project's coordinating group no later than October 20, and the winners will be announced in November.

There will be a student essay contest for the three age groups. The essays must be less than 750 words long, and the winning entries will be published in Computer Learning Month '88 press materials.

Following are some sample essay starters for this contest.

Primary:
- "In 2001, I'll use my computer to . . ."
- "If my computer could talk, it would say . . ."

Middle:
- "If I invented a computer, it would . . ."
- "Computers can help a person understand . . ."

Secondary:
- "In 2087, I'll use my computer to . . ."
- "One thing I've always wanted to do with a computer, but never have, is . . ."

You can get other essay topics by contacting the Computer Learning Month group at the address mentioned below in this article.

Two of the contests are devoted to student art. In one, the art must be completely computer-generated. In the other, the work is to be done in any medium *other* than a computer, but its theme must address computer learning or computer use.

Another contest involves teacher's ideas for lessons. Here, teachers will submit lesson plans or ideas they've had for integrating computers into the classroom in an interesting way. The lesson plans may not exceed 1000 words, and the ideas must include objectives, materials, class time required, students' prerequisite skills, procedures, follow-up activities and references.

The fifth contest is for group projects where four or more students and a teacher have used a computer in an interesting learning situation in any subject area. The entries must include two parts: a project report of 1000 words or less and a document that demonstrates the work done for the project.

PARENT BOOKLETS AND BACK-TO-SCHOOL NIGHTS

In another Computer Learning Month project, the EPIE Institute is putting out a 16-page booklet called *What Every Parent Should Know About Educational Computing*. It suggests how computers can be used as learning tools in the school and at home, and how parents can work with schools to further their children's education. Walden Bookstores will distribute the booklet, beginning in September.

Many schools will be sponsoring "back-to-school computing nights" for parents. These events will highlight local school technology programs and offer parents a chance to use computers. They will also serve to promote community participation in funding and carrying out computer projects in the schools. To plan a back-to-school night in your community, contact the Computer Learning Month group for suggestions on how to get started.

INTERESTING STATISTICS

Among the Computer Learning Month materials that I've received (and that you can get by writing or phoning the group) is a fact sheet on computers in education in the U.S. I mention some of the facts here as food for thought. They suggest how far we've come and how far we have yet to go in spreading the effective use of computers in our schools.

Fact: Between 1981 and 1986, the proportion of American schools using computers in the classroom grew from 18 to 96 percent.

Fact: There are more than a million computers in public schools, and over 15 million students and 500,000 teachers in public and private schools use computers.

On the other hand . . .

Fact: On average, there are 37 students per computer, which means less than one per classroom.

Fact: Less than a third of all U.S. teachers (but more than half of all computer-using teachers) have had at least ten hours of computer training.

FURTHER INFORMATION

To receive the Computer Learning Month reading materials on how parents and schools can work together to promote computers in education, contact Katherine Borsecnik, Project Director, Computer Learning Month, PO Box 19763, Washington, DC 20036-0763; 202-223-4338.

LEARNING ABOUT MONEY

This month, I've decided to include a program listing in my column. The program, called Money, works on the C-64 and was written and donated by ►

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Cybervideo (Touchstone)	30
Doodle (Crystal Rose)	29
Flexidraw 5.5 (Inkwell)	29
Lightpen 170C	75
Lightpen 184C	49
FlexiFont	24
Gallerias - each	21
Holiday/Clip Art I/Clip Art II/ Borders/Animals/Futuristic/ Needlegraphics	
Graphics Integrator 2 (Inkwell)	25
Graphic Label Wizard (Kra Jax)	19
Graphics Transformer (CDA)	25
Home Designer 128 (Kendall)	45
Icon Factory (Solo Unlmtd)	29
Moving Pictures (CDA)	20
Perspectives II (Kira)	39
Picasso's Revenge (Progress)	49
Photo Finish (Sol Unlmtd)	25
Pop-Up Greetings (Patech)	34
Printmaster Plus (Unison)	25
Art Gallery I or II	17

AIDS/UTILITIES

1541/1571 Dr Align (Free Sp)	29
40/80 Column Switch Cables	19
Assembler/Monitor (Abacus)	29
Basic 8 (Putech)	30
BASIC Compiler 128 (Abacus)	45
BASIC Compiler 64 (Abacus)	29
BBS Construction Set (Kira)	43
Big Blue Reader (Sogwap)	25
Big Blue Reader CP/M	32
Bobsterm Pro 64 (Progress)	39
Bobsterm Pro 128 (Progress)	59
Gnome Kit 64/128 (Kira)	29
Gnome Speed 128 (Kira)	39
Gnome Mac 128 (Kira)	10
How To Get Most GEOS Book	13
How To Get Most GEOS Disk	9
Kracker Jax Volumes 1-6 EACH	17
K Jax Shotgun	13
K Jax Loaded Shotgun	17
K Jax C128 Cannon	29
K Jax MSD Dual Cannon	29
K Jax Bull's Eye	17
Kyan Pascal 64 or 128	52
Phy Exam 1541 or 1571 (Card)	$29
Power Assembler 64/128 (Sp)	30
Power C 64/128 (Spinn)	30
Programmer's Tool Box (Spinn)	17
Prototerm 128	12
Super C 128 or 64 (Abacus)	45
Super Graphix (Xetec)	79
Super Graphix Jr. (Xetec)	49
Superkit 1541 (Prism)	25
Super Rascal 128 or 64 (Abac)	45
Super Snapshot (K Jax)	49
Troubleshoot & Repair C64 Book	16
Turbo Load & Save Cart (Spinn)	19
CPM Kit 128 (Inca)	25
TSOS Super Assembler	39

HOME/BUSINESS

Accountant 128 (KFS)	119
BEST A/P 64	45
BEST A/R 64	45
BEST G/L 64	50
BEST Inventory 64	50
BEST Project Planner	50
Business Form Shop (Spinn)	30
Checkbook 128 (Nu Age)	17
CMS Accounting 128	129
Inventory Module	53
Easy Working Filer/Planner or Writer (Spinn)	10
Fleet System 2 + (Professional)	39
Fleet System 4 (Professional)	59
Fleet Filer 64 (Professional)	29
FlexFile 64 or 128 (Cardinal)	39
Fontmaster 128 (Xetec)	39
Fontmaster II 64 (Xetec)	35
GEOS 128 (Berkeley)	49
Add-ons	call
GEOS 64 (Berkeley)	39
Geoprint	29
Fontpak I	22
Geodex	29
Geocalc	35
Geofilc	35
Desk Pack I	22
Writer's Workshop	33
Pocket Superpak 64 (Dig Sol)	49
Pocket Superpak 2 64/128	69
Pocket Dictionary (Dig Sol)	10
Pocket Writer 64 (Dig Sol)	29
Pocket Writer 2 (Dig Sol)	45
Superbase 64	59
Superbase 128	69
Superscript 128	59
ThoughtForm 64 (Gallery)	26
Vizistar 128	65
Viziwrite 128	65
Wordpro 128/Spell/Filepro	30
Wordpro 64/Spell/Turbo	30

PERSONAL

Bridgemaster (Radarsoft)	$12
Cardio Exercise (Bodylog)	69
Celebrity Cookbook (Merrill)	25
Classical Music - 10 diff. disks (Strider) EACH	9
Crossword (Radarsoft)	12
Disk/Video/Mag Catalogue 128	29
Dream Analayzer (Merrill)	25
Enhanced Stress (Bodylog)	199
Family Tree 128 or 64 (Genco)	39
Muscle Development (Bodylog)	54
Sexual Edge (Merrill)	20
Standard Stress (Bodylog)	89
Tempo Typing (Radarsoft)	12
T-Shirt Shop (Spinn)	39

EDUCATIONAL

Fisher Price	
Peter Rabbit Reading (3-6)	19
Peter & Wolf Music (3-7)	19
Jungle Book Reading (6-9)	19
First Men on Moon Math (9 +)	19
Widham Classics Graphic Adven	
Treasure Island (10 +)	22
Alice in Wonderland (10 +)	8
Wizard of Oz (10 +)	22
Swiss Family Robinson (10 +)	22
Below the Root (10 +)	22
Hayden Score Imp For SAT	
Math	17
Verbal	17
Practice Exams	17
All 3	35
Spinnaker	
Facemaker-Amiga (3-8)	39
Alphabet Zoo (3-7)	18
Kids on Keys (4-9)	18
Math Busters (8-14)	22
Kidwriter (6-10)	22
Homework Helper Math (10 +)	29
Homework Helper Write (10 +)	29
Alpha Build (3-8)	6
Counting Parade (3-8)	6
Early Learning Friends (3-8)	6
Grandma's House	6
Educational Videos-Spinnaker	
Readers of Lost Alpha (5-8)	12
Adventures of Time Taxi (5-8)	12
Search for Stolen Sentence	12
Close Encounters of Math Kind	12
Captain Kangaroo Videos	
Right Thing To Do (3-8)	9
Favorite Adventures (3-8)	9
Tales From Mother Goose (3-8)	9
Silly Stories/Scary Tales (3-8)	9
Beat The SAT - Verbal Video	18
Beat The SAT - Math Video	$18
Maps USA/World or Europe	19

AMIGA

Analyze 2 0 (Brown W)	119
Lexcheck (CDA)	35
LFD Writer/Planner OR Filer (Digital Solu)	89
Pagesetter (Gold Disk)	119
Gold Spell	35
Lazer Script	35
Printmaster Plus (Brown W)	39
Publisher 1000 (N.E. Soft)	149
Superbase (Progress)	119
TV Text (Brown W)	79
Viziwrite (Progress)	119

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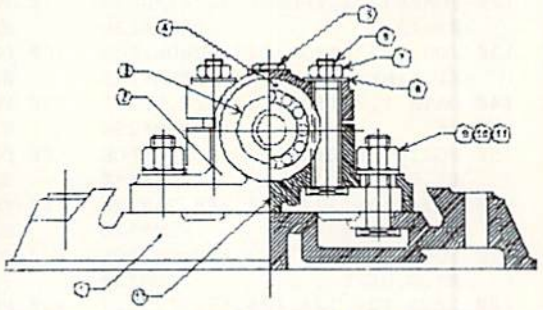

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- Flexidraw 5.5 + 170C Pen - **$100**
- Flexidraw 5.5 + 184C Pen - **$75**
- Graphics Integrator 2 + Graphics Transformer + Icon Factory - **$75**
- Doodle + Moving Pictures - **$48**
- KFS Accountant 128 + Add-on Module - **$169**
- Gallerias with Flexidraw and Pen - **$19 each**
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- Maps Europe + USA + World - **$50**
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Michael McKellips of the Lexington School, 1130 W. Co. Rd. B, Roseville, Minnesota. McKellips has been using C-64s in his special-education classroom for the past four years, but he's had difficulty locating software for moderately retarded students. To solve this problem, he started writing his own.

He's also written programs to assist teachers in managing student data and generating reports. In the future, he hopes to market a program called IEP Writer, which helps teachers generate individual educational plans (IEPs).

His Money program provides practice in recognizing coins and counting change. It's appropriate for elementary-age students and foreign-born adults who are trying to learn our currency, as well as for its intended audience, the moderately retarded.

If you're using Commodore computers for educational purposes (at home or in school) and would like to share your experiences through the Resource Center, write me a letter detailing the equipment you're using, subject areas you teach, grade level or age of your students, software you're using and any other information you feel like including.

Also, if you'd like to donate public domain educational programs to the Resource Center for sharing with other educators or parents, please send along a disk with a brief description of the program. Send correspondence and disks to:

Margaret Morabito
Resource Center
c/o RUN Magazine
80 Elm St.
Peterborough, NH 03458

You can also leave mail in my online mailboxes: CompuServe (70616,714) and QuantumLink (MARGM).

LISTING 1. The Money program.

```
10 REM PROGRAM WRITTEN AND DONA
   TED BY MICHAEL MCKELLIPS ROS
   EVILLE{2 SPACEs}MINN.:REM*56
20 PRINTCHR$(142):POKE53281,0
                       :REM*218
30 PRINT"{SHFT CLR}":POKE53281,
   0:POKE53280,0       :REM*102
40 PRINT"{COMD 7}{8 CRSR DNs}{1
   3 CRSR RTs}PLEASE WAIT."
                       :REM*100
50 FORL=54272TO54296:POKEL,0:NE
   XT                   :REM*74
60 POKE52,48:POKE56,48:CLR
                        :REM*24
70 POKE56334,PEEK(56334)AND254
                       :REM*234
80 POKE1,PEEK(1)AND251   :REM*4
90 FORI=0TO695:POKEI+12288,PEEK
   (I+53248):POKEI+49152,PEEK(I
   +53248):NEXT        :REM*140
100 POKE1,PEEK(1)OR4   :REM*100
110 POKE56334,PEEK(56334)OR1
                        :REM*34
120 POKE53272,(PEEK(53272)AND24
    0)+12              :REM*226
130 FORI=12288TO12295:READA:POK
    EI,A:NEXT          :REM*146
140 DATA 1,7,15,31,63,126,126,1
    26                 :REM*250
150 FORI=12552TO12559:READB:POK
    EI,B:NEXT            :REM*0
160 DATA 128,224,240,248,252,25
    4,126,126          :REM*128
170 FORI=12568TO12575:READC:POK
    EI,C:NEXT           :REM*34
180 DATA 126,126,126,63,31,15,7
    ,1                  :REM*70
190 FORI=12576TO12583:READD:POK
    EI,D:NEXT          :REM*248
200 DATA 126,126,254,252,248,24
    0,224,128          :REM*226
210 FORI=12584TO12591:READE:POK
    EI,E:NEXT          :REM*202
220 DATA 255,255,255,255,255,24
    0,239,239          :REM*158
230 FORI=12592TO12599:READF:POK
    EI,F:NEXT          :REM*102
240 DATA 239,239,240,255,255,25
    5,255,255           :REM*14
250 FORI=12600TO12607:READG:POK
    EI,G:NEXT           :REM*80
260 DATA 15,63,127,127,255,255,
    255,255            :REM*187
270 FORI=12608TO12615:READA:POK
    EI,A:NEXT          :REM*151
280 DATA 1,7,15,31,63,127,127,1
    27                 :REM*207
290 FORI=12616TO12623:READB:POK
    EI,B:NEXT          :REM*111
300 DATA 128,224,240,248,252,25
    4,254,254          :REM*135
310 FORI=12624TO12631:READC:POK
    EI,C:NEXT           :REM*65
320 DATA 127,127,127,63,31,15,7
    ,1                  :REM*21
330 FORI=12632TO12639:READD:POK
    EI,D:NEXT          :REM*219
340 DATA 255,255,255,255,255,24
    7,247,247          :REM*239
350 FORI=12640TO12647:READE:POK
    EI,E:NEXT          :REM*177
360 DATA 247,247,247,255,255,25
    5,255,255           :REM*49
370 FORI=12648TO12655:READF:POK
    EI,F:NEXT          :REM*153
380 DATA 254,254,254,252,248,24
    0,224,128           :REM*17
390 FORI=12808TO12815:READG:POK
    EI,G:NEXT          :REM*109
400 DATA 240,252,254,254,255,25
    5,255,255           :REM*31
410 FORI=12816TO12823:READH:POK
    EI,H:NEXT           :REM*67
420 DATA 255,255,255,255,127,12
    7,63,15            :REM*145
430 FORI=12824TO12831:READJ:POK
    EI,J:NEXT          :REM*155
440 DATA 255,255,255,255,254,25
    4,252,240          :REM*145
450 FORI=12832TO12839:READD:POK
    EI,D:NEXT          :REM*149
460 DATA 255,255,255,255,255,0,
    127,127            :REM*175
470 FORI=12840TO12847:READE:POK
    EI,E:NEXT          :REM*107
480 DATA 1,254,254,1,255,255,25
    5,255              :REM*219
490 FORI=12848TO12855:READF:POK
    EI,F:NEXT           :REM*83
500 DATA 0,0,0,0,0,1,1,1:REM*73
510 FORI=12856TO12863:READG:POK
    EI,G:NEXT           :REM*41
520 DATA 1,1,1,0,0,0,0,0
                       :REM*100
530 FORI=12864TO12871:READH:POK
    EI,H:NEXT          :REM*252
540 DATA 0,0,0,0,0,0,0,3
                       :REM*214
550 FORI=12872TO12879:READJ:POK
    EI,J:NEXT           :REM*28
560 DATA 0,0,0,0,0,0,0,255
                       :REM*102
570 FORI=12880TO12887:READK:POK
    EI,K:NEXT          :REM*240
580 DATA 0,0,0,0,0,0,0,192
                       :REM*112
590 FORI=12888TO12895:READL:POK
    EI,L:NEXT          :REM*214
600 DATA 0,0,0,0,0,128,128,128
                       :REM*204
610 FORI=12896TO12903:READM:POK
    EI,M:NEXT           :REM*74
620 DATA 128,128,128,0,0,0,0,0
                       :REM*172
630 FORI=12904TO12911:READN:POK
    EI,N:NEXT          :REM*148
640 DATA 3,0,0,0,0,0,0,0:REM*76
650 FORI=12912TO12919:READO:POK
    EI,O:NEXT           :REM*46
660 DATA 255,0,0,0,0,0,0,0
                       :REM*188
670 FORI=12920TO12927:READP:POK
    EI,P:NEXT            :REM*2
680 DATA 192,0,0,0,0,0,0,0
                       :REM*168
690 FORI=12928TO12935:READQ:POK
    EI,Q:NEXT          :REM*232
700 DATA 0,0,0,0,0,31,255,255
                       :REM*108
710 FORI=12936TO12943:READR:POK
    EI,R:NEXT          :REM*194
720 DATA 255,255,31,0,0,0,0,0
                       :REM*120
730 FORI=12944TO12951:READS:POK
    EI,S:NEXT          :REM*148
740 DATA 63,0,0,0,0,0,0,0
                        :REM*32
750 FORI=12952TO12959:READT:POK
    EI,T:NEXT           :REM*46
760 DATA 255,255,248,0,0,0,0,0
```

```
                              :REM*182
770 FORI=12960TO12967:READU:POK
    EI,U:NEXT                 :REM*3
780 DATA 0,0,0,0,0,248,255,255
                              :REM*121
790 FORI=12968TO12975:READV:POK
    EI,V:NEXT                 :REM*235
800 DATA 255,255,255,255,255,3,
    253,253                   :REM*85
810 FORI=12976TO12983:READW:POK
    EI,W:NEXT                 :REM*193
820 DATA 129,127,127,1,255,255,
    255,255                   :REM*67
830 D$="{COMD 8}{CRSR RT}@%!{CR
    SR DN}{3 CRSR LFs}#&${CRSR
    UP}"                      :REM*61
840 P$="{COMD 2}{CRSR RT}(+){CR
    SR DN}{3 CRSR LFs}*,-{CRSR
    UP}"                      :REM*167
850 N$="{CRSR UP}{CRSR RT}{COMD
     8}{SHFT H}{SHFT I}{SHFT J}
    {CRSR DN}{4 CRSR LFs}{SHFT
    F}'{SHFT D}{SHFT A}{SHFT K}
    {CRSR DN}{5 CRSR LFs}{SHFT
    G}{SHFT B}{SHFT E}{SHFT C}{
    SHFT L}{CRSR DN}{4 CRSR LFs
    }{SHFT M}{SHFT N}{SHFT O}{2
     CRSR UPs}"               :REM*187
860 Q$="{CRSR UP}{CRSR RT}{COMD
     8}{CRSR RT}{SHFT H}{SHFT P
    }{SHFT T}{SHFT J}{CRSR DN}{
    5 CRSR LFs}{SHFT F}'{SHFT U
    }{SHFT D}{SHFT A}{SHFT K}{C
    RSR DN}{6 CRSR LFs}{SHFT G}
    {SHFT B}{SHFT V}{SHFT E}{SH
    FT C}{SHFT L}{CRSR DN}{5 CR
    SR LFs}{SHFT M}{SHFT Q}{SHF
    T S}{SHFT O}{2 CRSR UPs}"
                              :REM*15
870 PRINT"{SHFT CLR}"SPC(11)"{C
    OMD 2}#!#!#!#!#!#!#!#!"
                              :REM*139
880 PRINTSPC(11)"#!{14 SPACEs}#
    !"                        :REM*153
890 PRINTSPC(11)"#! MONEY{2 SPA
    CEs}GAMES #!"             :REM*145
900 PRINTSPC(11)"#!{14 SPACEs}#
    !"                        :REM*173
910 PRINTSPC(11)"{COMD 2}#!#!#!
    #!#!#!#!#!"               :REM*225
920 C$(1)="PENNY":C$(2)="NICKEL
    ":C$(3)="DIME":C$(4)="QUART
    ER"                       :REM*219
930 PRINT"{2 CRSR DNs}{2 SPACEs
    }"P$"{CRSR DN} "C$(1):GOSUB
    1510                      :REM*93
940 PRINT"{2 CRSR DNs}{2 SPACEs
    }"N$"{CRSR DN}{CRSR RT}"C$(
    2):GOSUB1510              :REM*7
950 PRINT"{2 CRSR DNs}{2 SPACEs
    }"D$"{CRSR DN}{CRSR RT}"C$(
    3):GOSUB1510              :REM*1
960 PRINT"{2 CRSR DNs} "Q$"{CRS
    R DN}{CRSR RT}"C$(4):GOSUB1
    510                       :REM*69
970 POKE54296,0               :REM*85
980 PRINT"{COMD 8}{HOME}{13 CRS
    R DNs}"SPC(25)"HIT ANY KEY"
                              :REM*239
990 GETAN$:IFAN$=""THEN990
                              :REM*183
1000 IFPEEK(653)=4ANDPEEK(197)=
     57THEN1600               :REM*181
1010 GOTO1020                 :REM*251
1020 PRINT"{SHFT CLR}"SPC(15)"{
     COMD 8}HOW MUCH ?{CRSR DN}
     {10 CRSR LFs}{COMD 2}{10 S
     HFT Ns}"                 :REM*89
1030 PRINT"{2 CRSR DNs}{COMD 2}
     DIRECTIONS: {COMD 8}YOU WI
     LL BE SHOWN A GROUP OF{12
     SPACEs}COINS.";         :REM*130
1040 PRINT" ENTER HOW MUCH THEY
     {14 SPACEs}TOTAL.":REM*188
1050 PRINT"{CRSR DN}{COMD 2}CHO
     OSE RANGE FOR TOTALS:"
                              :REM*210
1060 PRINT"{CRSR DN}{5 CRSR RTs
     }{COMD 8}1.{2 SPACEs}{COMD
      2}UP TO 10 CENTS":PRINT"{
     CRSR DN}{5 CRSR RTs}{COMD
     8}2.{2 SPACEs}{COMD 2}UP T
     O 20 CENTS"              :REM*58
1070 PRINT"{CRSR DN}{5 CRSR RTs
     }{COMD 8}3.{2 SPACEs}{COMD
      2}UP TO 30 CENTS":PRINT"{
     CRSR DN}{5 CRSR RTs}{COMD
     8}4.{2 SPACEs}{COMD 2}UP T
     O 50 CENTS"              :REM*8
1080 PRINT"{CRSR DN}{5 CRSR RTs
     }{COMD 8}5.{2 SPACEs}{COMD
      2}UP TO 75 CENTS":PRINT"{
     CRSR DN}{5 CRSR RTs}{COMD
     8}6.{2 SPACEs}{COMD 2}UP T
     O 1 DOLLAR"              :REM*38
1090 GOSUB1380                :REM*78
1100 PRINT"{15 CRSR DNs}{COMD 2
     }WHAT IS YOUR NAME ? {COMD
      8}";:POKE19,64:INPUTNA$:P
     OKE19,0                  :REM*24
1110 PRINT"{SHFT CLR}{3 CRSR DN
     s}"                      :REM*28
1120 IFFL=1THENN=INT(RND(1)*2+1
     ):GOTO1150               :REM*224
1130 IFFL=2THENN=INT(RND(1)*3+1
     ):GOTO1150               :REM*44
1140 N=INT(RND(1)*4+1) :REM*158
1150 IFN=1THENPRINTP$;:AV=AV+1
                              :REM*26
1160 IFN=2THENPRINTN$;:AV=AV+5
                              :REM*82
1170 IFN=3THENPRINTD$;:AV=AV+10
                              :REM*228
1180 IFN=4THENPRINTQ$;:AV=AV+25
                              :REM*72
1190 CO=CO+1:IFCO=5THEN1230
                              :REM*46
1200 IFFL=1THEN1120           :REM*44
1210 IFFL=2THEN1130          :REM*122
1220 GOTO1140                 :REM*30
1230 IFAV>TVTHENAV=0:CO=0:GOTO1
     110                      :REM*170
1240 PRINT: PRINT"{3 CRSR DNs}{
     COMD 2}HOW MUCH {COMD 8}";
     :INPUTG$                 :REM*170
1250 G=VAL(G$):IFG=0THENPRINT"{
     6 CRSR UPs}":GOTO1240
                              :REM*150
1260 IFG=AVTHENPRINT"{HOME}{11
     CRSR DNs}{CTRL 5}THATS RIG
     HT "NA$" {CTRL 2}"AV" {CTR
     L 5}CENTS":R=R+1    :REM*18
1265 GOTO1280                 :REM*221
1270 PRINT"{HOME}{11 CRSR DNs}{
     COMD 6}NO "NA$" IT IS {CTR
     L 2}"AV" {CTRL 6}CENTS":W=
     W+1                      :REM*188
1280 PRINT"{COMD 2}{2 CRSR DNs}
     HIT ANY KEY"             :REM*27
1290 GETAN$:IFAN$=""THEN1290
                              :REM*171
1300 IFPEEK(653)=4ANDPEEK(197)=
     57THEN1600               :REM*227
1310 CO=0:AV=0:TC=TC+1:IFTC=10T
     HEN1330                  :REM*217
1320 GOTO1110                 :REM*35
1330 PRINT"{SHFT CLR}"  :REM*45
1340 IFR>8THENPRINT"{HOME}{3 CR
     SR DNs}{CTRL 5}GREAT JOB {
     CTRL 2}"NA$" {CTRL 5}YOU G
     OT {CTRL 2}"R" {CTRL 5}RIG
     HT.":GOTO1550            :REM*237
1350 IFR>5THENPRINT"{HOME}{3 CR
     SR DNs}{CTRL 5}WAY TO GO {
     CTRL 2}"NA$" {CTRL 5}YOU G
     OT {CTRL 2}"R" {CTRL 5}RIG
     HT.":GOTO1550            :REM*249
1360 PRINT"{HOME}{3 CRSR DNs}{C
     TRL 5}YOU GOT {CTRL 2}"R"
     {CTRL 5}RIGHT.":GOTO1550
                              :REM*205
1370 STOP                     :REM*161
1380 PRINT"{HOME}{8 CRSR DNs}"S
     PC(24)"{COMD 8}?{CRSR LF}"
     ;:POKE204,0              :REM*93
1390 GETAN$:POKE207,0:IFAN$=""T
     HEN1390                  :REM*107
1400 POKE204,1:PRINT" ":REM*181
1410 IFPEEK(653)=4ANDPEEK(197)=
     57THEN1600               :REM*81
1420 V=VAL(AN$)               :REM*209
1430 IFV<1ORV>6THENPRINT"{3 CRS
     R UPs}":GOTO1380   :REM*203
1440 IFV=1THENTV=10:FL=1
                              :REM*249
1450 IFV=2THENTV=20:FL=2:REM*39
1460 IFV=3THENTV=30           :REM*73
1470 IFV=4THENTV=50          :REM*123
1480 IFV=5THENTV=75          :REM*213
1490 IFV=6THENTV=100         :REM*195
1500 RETURN                   :REM*27
1510 POKE54296,15:POKE54277,9:P
     OKE54273,110:POKE54278,9
                              :REM*59
1520 POKE54276,17:FORT=1TO150:N
     EXT                      :REM*227
1530 POKE54276,16:FORT=1TO500:N
     EXT:RETURN               :REM*179
1540 G=VAL(G$)                :REM*46
1550 PRINT"{3 CRSR DNs}WANT TO
     PLAY AGAIN <Y/N>?":REM*190
1560 GETAN$:IFAN$=""THEN1560
                              :REM*184
1570 IFAN$="Y"THENCLR:GOTO830
                              :REM*84
1580 IFAN$="N"THEN1600 :REM*192
1590 GOTO1560                 :REM*18
1600 END                      :REM*72
```

■

From p. 14.

```
30 X=Q*5+120
10 A=6:B=1:A$="XYZ":C$="TO"
```

Now just move the cursor back up and type 40 over the 10 in your revised line and hit return. If the original line 10 is not needed, delete it.

This seems more difficult than it is. It'll come easy after you use it a few times.

—Jeff Stafford, Rochester, IN

$42E Editing Cursor Movements

It's happened to all of us: You've typed the wrong cursor character in a line within quotes and you've got to correct it. Here's an easy way to correct the line without retyping all of it.

List the line and move the cursor to the character after the error, press the delete key once and the insert key once. This will put you in Quote mode so that you can substitute the correct character. Type in the correct character to exit Quote mode, and press return to enter the changed line.

Try this a few times on a practice line containing a Print statement with several cursor characters inside quotes.

—L. M. LaBar, Bethlehem, PA

$42F Faster If-Thens

If-Then statements containing the word AND execute more quickly if you replace each AND with THEN IF. This method works faster because program execution is automatically transferred to the next line if any single condition proves false. Try to put the condition most often false first to get the greatest gain in speed. Use this short program to compare the AND and THEN IF methods:

```
10 REM FASTER IF/THEN-GEORGE MONTELEONE
20 REM LINES 20-40 SHOW OLD METHOD
30 TI$="000000":FORI=1TO1000
40 IF I=100 AND I/3*20=4 AND INT(I/256)+39
   =I THEN F=F+1
50 NEXT:PRINT"TIME FOR OLD METHOD:"TI
60 REM LINES 70-90 DO SAME AS ABOVE
70 REM EACH 'AND' REPLACED BY 'THEN IF'
80 TI$="000000":FORI=1TO1000
90 IF I=100 THEN IF I/3*20=4 THEN IF INT(I
   /256)+39=I THEN F=F+1
100 NEXT:PRINT"TIME FOR NEW METHOD:"TI
```

—George Monteleone, Windsor, Ontario, Canada

$430 Reminder 128 Revisited

If you make Reminder 128, *RUN*'s electronic desk calendar (see the January 1987 issue), the autoboot program on your most frequently used disk, such as your word processor, you won't have to remember to run it. I use RUN Script often, so I made up a disk with the RUN Script files on it along with the Reminder 128 program. You can put Reminder 128 as the first program and run it with the shifted run-stop key or add a boot sector. Make the following change to the Reminder 128 program before saving it to the new disk:

```
2295 PRINT "LOADING RUN SCRIPT..."
2297 RUN "BOOT"
```

If you want to run a machine language program, replace the Run command with BOOT in line 2297. Now, after your appointment calendar is checked, your word processor will be loaded for your use. (Change the text in quotes to suit your own program.)

—Randy W. Barthel, Cincinnati, OH

$431 Hex-to-Decimal Converter

My program converts hex numbers to decimal form. It can convert numbers up to $3B9AC9FF (999,999,999 in decimal). The program works on any Commodore computer.

```
10 REM LARGE HEX CONVERSION (ALL)-ROGER MO
   ORE
20 INPUT"NUMBER IN HEX";H$:L=LEN(H$):S=0
30 FORI=LTO1STEP-1:A=ASC(MID$(H$,I,1))
40 IFA>64ANDA<71 THEN S=S+(A-55)*16{UP ARR
   OW}(L-I):GOTO70
50 IFA<48ORA>57 THEN80
60 S=S+(A-48)*16{UP ARROW}(L-I)
70 NEXT:PRINT"DECIMAL EQUIVALENT IS:"S:GOT
   O20
80 PRINT"THAT IS NOT A VALID HEX NUMBER!"
```

—Roger Moore, Oak Ridge, TN

$432 C-128 Radar Locator

While I was using the Draw command, I got unexpected results, and upon checking my program, I found that I had used a syntax that allows a line to be drawn out a certain distance from the center at a given angle. After further experimentation, I found that the Locate command allows the same syntax. This short program shows how this use of Draw and Locate works:

```
0 REM C-128 RADAR-ANDRES KICELEFF
10 COLOR0,1:COLOR1,2:GRAPHIC1,1:CIRCLE1,16
   0,100,83,83:CIRCLE1,160,100,40,40
20 L=35:DI=0:VE=5:LOCATE160,100
30 DRAW1,160,100TOL;DI:LOCATE10;DI:DRAW1,R
   DOT(0),RDOT(1)TOL;DI:LOCATE160,100:DRAW
   0,160,100TOL;DI:LOCATE10;DI:DRAW0,RDOT(
   0),RDOT(1)TOL;DI:DI=DI+VE
40 IFDI>360THENDI=DI-360:GOTO30:ELSEGOTO30
```

—Andres Kiceleff, Buenos Aries, Argentina

$433 80-Column Register Table

With this program, you can examine each of the 37 registers of the C-128's 8563 chip. It also shows how to use the RREG command to pass the computer's registers back to the Basic program. (See trick $3BA in the March Magic column for more about the RREG command.)

If you have a copy of the *Commodore 128 Programmer's Reference Guide*, you can use the printout to better understand the 8563 chip by comparing the printout to the register map on page 294.

The program should work with any printer. If you don't have a printer, change the OPEN4,4 in line 4 to OPEN4,3 to display the chart on the screen.

```
0 REM 8563 REG.TABLE-TOM SMITH
2 PRINT"{SHFT CLR}{3 CRSR DNs}{2 SPACEs}BE
  SURE PRINTER IS ON...":PRINT"PRESS ANY
  KEY TO START..."
4 GETKEYA$:OPEN4,4:GOSUB18:PRINT#4,"! * *
  * * 8563 80-COL CHIP REGISTERS * * * * !

6 GOSUB18:PRINT#4,"!{12 SPACEs}!{7 SPACEs}
  BINARY BIT TABLE{8 SPACEs}!"
8 PRINT#4,"! REG#{2 SPACEs}DEC# ! 7 ! 6 !
  5 ! 4 ! 3 ! 2 ! 1 ! 0 !":GOSUB18
10 FORZ=0TO36:SYS52698,,Z:RREG A:PRINT#4,"
   ! "N;SPC(4-LEN(STR$(N)))A;
12 PRINT#4,SPC(5-LEN(STR$(A)))"!";
14 FORL=7TO0STEP-1:PRINT#4,-((AAND2{UP ARR
   OW}L)=2{UP ARROW}L)"!";:NEXT:PRINT#4:N=
   N+1:NEXT
16 GOSUB18:PRINT#4:CLOSE4:END
18 FORL=1TO23:PRINT#4,"--";:NEXT:PRINT#4:R
   ETURN
```

—THOMAS B. SMITH, GALLIPOLIS, OH

$434 C-64 CURSOR LOCATOR

This is my method of placing the cursor where I want it on my 64 screen. It's less trouble to use than some other routines I've tried, and it requires only 36 bytes of memory. I usually place the routine beginning at location 679, but you may relocate it to any available 36 bytes. Put this short routine in your programs:

After this section is run in your program, just use SYS SA,C,R to move the cursor. The value of SA is the beginning of the ML code. The column is passed next as C (0 to 39) and the row is passed last as R (0 to 24). You may use any number or variable in place of C or R as long as they are within the legal range.

```
0 REM 64 PRINT @-HARRY SIMMS
10 SA=679:FORJ=SATOSA+35:READ B:C=C+B:POKE
   J,B:NEXT
15 IFC<>4639 THEN PRINT"DATA ERROR!!"
20 DATA 32,253,174,32,158,183,138,56,201,4
   0,144,5,162,14,76,139,227,72
30 DATA 32,253,174,32,158,183,138,56,201,2
   5,176,238,104,168,24,76,240,255
```

—HARRY SIMMS, TEXARKANA, TX

$435 C-128 JUMBO HI-RES TEXT

This short subroutine takes advantage of the C-128's powerful graphics commands to create double-size characters on the hi-res, 40-column screen. Three variables are used in the subroutine:

—T$ for the text to be printed
—XT for the horizontal (X) position
—YT for the vertical (Y) position

Here's the subroutine with an example:

For an added twist, add YT = YT + .5: before the NEXT in line 1000.

```
10 REM JUMBO HI-RES TEXT-JASON S. MACDONAL
   D
20 GRAPHIC2,1,20:REM-EXAMPLES-:
30 XT=25:YT=35:T$="MAGIC IS":GOSUB1000
40 XT=55:YT=60:T$="GREAT FUN!!":GOSUB1000:
   END
```

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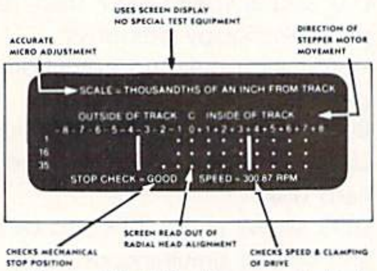
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```
1000 CHAR1,0,24,T$:FORA=1TOLEN(T$)*8:SSHAP
     E A$,A-1,192,A-1,200:GSHAPEA$,XT+X1-1
     ,YT:GSHAPE A$,XT+X1,YT:X1=X1+2:NEXT:X
     1=0
1010 CHAR1,0,24,"{40 SPACEs}":RETURN
```

—JASON S. MACDONALD, MENA, AR

$436 C-64 WINNING FANFARE

Here's a sound effect to reward a winning game player or acknowledge a correct answer. Use it as a subroutine in your C-64 programs.

```
0 REM WINNING FANFARE-J.R.CHARNETSKI
800 T=87:N$="251331421502421502"
810 S=54272:POKES+6,96:POKES+24,15
820 FORI=1TO18 STEP3
830 POKES+1,VAL(MID$(N$,I,2)):POKES+4,33
840 FORJ=1TOT*VAL(MID$(N$,I+2,1)):NEXT
850 POKES+4,0:NEXT:REM [RETURN]
```

—JOSEPH R. CHARNETSKI, DALLAS, PA

$437 FAST-RUN

The instruction manual for my Epyx Fast Load cartridge does not give a command for loading and running any Basic program. However, you can easily do this by adding a delimiter to the end of the filename. Then use shifted run-stop. The asterisk (*) is the best delimiter, since it will serve double-duty as both a wild card in the filename and as the delimiter.

Here's an example of loading the first file on the disk that begins with the letters DO: /DO*{shift/run-stop}

Note that a colon isn't necessary.

—ROBERT E. TUM SUDEN, FLORAL PARK, NY

$438 INTERESTING FIGURES

If you're speculating on the future value of an investment that accumulates interest at a fixed rate, use this program to calculate the interest on your principal when interest is compounded daily, monthly or quarterly. The program displays the interest and rounds the total (interest and principal) to two decimal places.

```
10 REM INTEREST CALCULATOR-MARIE CHARNETSK
   I
20 PRINT"{SHFT CLR}{CRSR DN}IS THE INTERES
   T COMPOUNDED BY"
30 INPUT "(D)AY (M)ONTH OR (Q)UARTER";A$
40 INPUT"{CRSR DN}ANNUAL INTEREST RATE (AS
   %)";R
50 INPUT "{CRSR DN}AMOUNT OF PRINCIPAL";P
60 INPUT "{CRSR DN} FOR HOW MANY MONTHS";T

70 I=12:IFA$="D"THEN I=365
80 IF A$="Q" THEN I=4
90 C=R/100/I:J=T/12*I:S=P
100 R=C+1:P=R{UP ARROW}J*P
110 T$=MID$(STR$(INT(P/.01+.5)),2)
```

```
120 T$=LEFT$(T$,LEN(T$)-2)+"."+RIGHT$(T$,2
    )
130 PRINT"{CRSR DN}TOTAL INTEREST={CTRL 9}
    "P-S
140 PRINT"{CRSR DN}PRINCIPAL+INTEREST= $"T
    $
```

—Marie Charnetski, Plains, PA

$439 Search and Destroy?

When using your word processor's search-and-replace option, take care to replace only what you really want. You could, for example, use the letters US throughout a document for United States and later replace the abbreviation with the complete spelling. However, some word processors will find both upper- and lowercase versions. So it's possible you might replace "must" with "mUnited Statest". To prevent this, use an unusual combination, such as u1s or u*s. This should ensure that you do not destroy any text you don't want to replace.

—Jeremy A. Michele, Big Timber, MT

$43A C-128 Magic Clock

The following program uses the Time of Day clock, which keeps time more accurately than TI$.

Run the program and enter the time. It'll keep time until you turn off or reset your computer. Tap the ALT key to print the time on the next screen line.

Pressing run-stop/restore disables the ALT key without affecting the time, and entering SYS 4886 reactivates ALT.

```
10 REM 128 MAGIC CLOCK-NELSON SEARCY
30 KEY4,"BANK15:SYS4886"+CHR$(13)
40 INPUT "HR,MIN,SEC,AM/PM";H,M,S,A$
50 IF H>12ORM>59ORS>59THEN40
60 IF H>9THENH=16+H-10
70 IF M>9THENM=16*VAL(LEFT$(STR$(M),2))+VA
   L(RIGHT$(STR$(M),1))
80 IF S>9THENS=16*VAL(LEFT$(STR$(S),2))+VA
   L(RIGHT$(STR$(S),1))
90 IF LEFT$(A$,1)="P" THENH=H+128
100 POKE56331,H:POKE56330,M:POKE56329,S:PO
    KE56328,0
110 FORA=4886 TO 5006:READ J:CS=CS+J:POKEA
    ,J:NEXT
120 IFCS<>10404THENPRINT"DATA ERROR!":END
130 SYS4886:NEW
140 DATA 120,169,35,141,20,3,169,19,141,21
    ,3,88,96,165,211,201,8,208,96
150 DATA 173,11,220,48,4,162,65,208,2,162,
    80,142,134,19,41,127,32,102,19
160 DATA 201,48,208,2,169,32,141,125,19,14
    2,126,19,173,10,220,32,102,19
170 DATA 141,128,19,142,129,19,173,9,220,3
    2,102,19,141,131,19,142,132,19
180 DATA 173,8,220,76,119,19,72,41,15,9,48
    ,170,104,74,74,74,74,9,48,96,0,0
190 DATA 0,32,125,255,141,42,32,48,48,58,4
```

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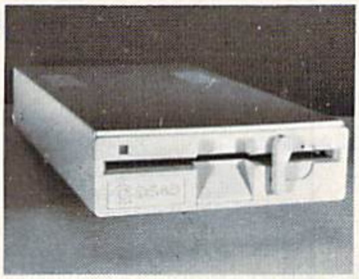

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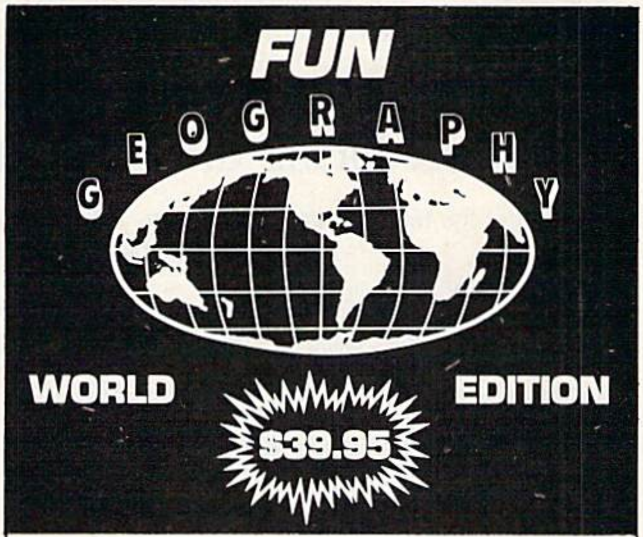

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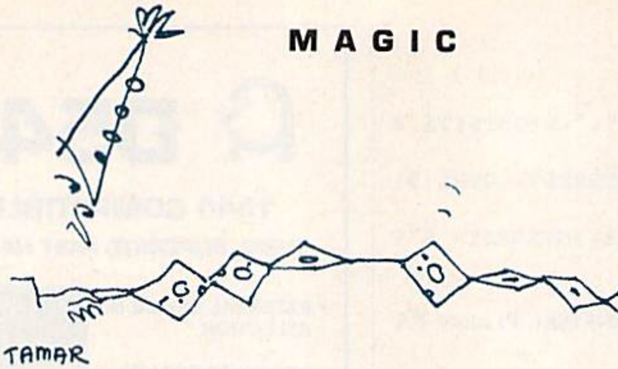

```
 8,48,58,48,48,32,80,141,0,76
200 DATA 101,250,0,0,0
```

—Nelson Searcy, Forest City, NC

$43B A Simple Thought Processor

If your word processor has a block-move function, as in RUN Script 64 or 128, you already have a simple and easy-to-use thought, or outline, processor. For readers not familiar with this type of program, a thought processor organizes your thoughts into a coherent outline. They're particularly useful for writing projects such as business reports and school term papers, and even for letters.

First type in each thought as a simple sentence, followed by a blank line. Then use the block-move feature to arrange your sentences in the appropriate order. Now you have an organized outline to work from. It's that easy!

—Ditto and E.T. Bjornsen, Hillsboro, NH ■

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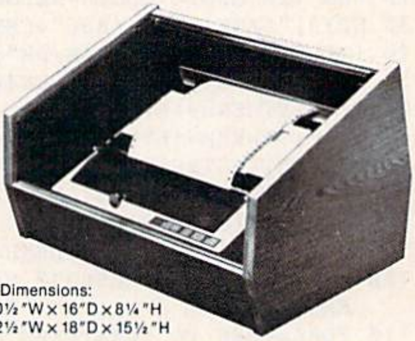

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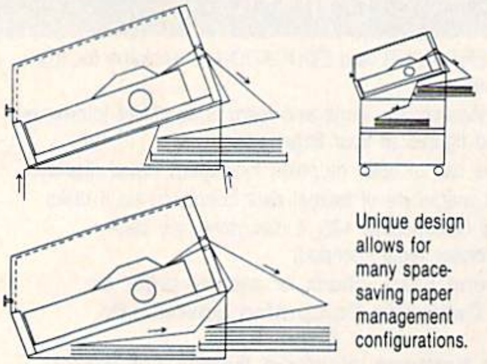

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How To Type RUN *Listings*

To simplify typing *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These follow a REM statement at the end of each line (e.g., :REM*123) and necessitate your using *RUN*'s Perfect Typist programs, listed below.

Type in 64 Perfect Typist (Listing 1) for 64 programs, or 128 Perfect Typist (Listing 2) for 128-mode programs, and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Jot down the two SYS numbers that appear on your screen. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN*. After you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line at the left margin. This is the checksum number, ranging from 0 to 255.

If this matches the checksum printed in the listing after the :REM*, you have typed that line correctly. Then type the next program line over the previous line's checksum value. If the checksum numbers do *not* agree, analyze the line on screen for errors or omissions. Make the needed changes and press the return key again to log them in. A new checksum will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, but before attempting to run it, turn the computer off and back on to completely clear out the Perfect Typist program.

You may save an incomplete program any time and continue it later. To do so, reload and run the Perfect Typist program, then load the program you were working on, list it, and continue from where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. Follow instructions inside curly brackets. For example, {SHIFT L} means you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. 64 Perfect Typist program.

```
1 REM 64 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:N
   EXT
40 IFT<>16251 THEN PRINT"ERROR IN DATA..."
   :END
60 POKEML+4,PG:POKEML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,
   PG
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}***************
   ************************"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TY
   PIST IS NOW ACTIVE{2 SPACEs}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs
    }SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}***********************
    ***************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

Listing 2. 128 Perfect Typist program.

```
1 REM 40/80 COL C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 FORX=5120TO5379:READD:T=T+D:POKEX,D
20 NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}E
   RROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{20 SPACEs}"
30 PRINT"{SHFT CLR}"A$" *****************
   ********************"
40 PRINTA$" ** 128 PERFECT TYPIST IS NOW A
   CTIVE **"
50 PRINTA$" **{2 SPACEs}SYS 5120=ON{7 SPAC
   Es}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$" *****************************
   ********":SYS5120:NEW
70 DATA 173,5,3,201,20,208,1,96,141,45,20,
   173,4,3,141,44,20,162,43,160,20
80 DATA 142,4,3,140,5,3,96,234,234,173,44,
   20,141,4,3,173,45,20,141,5,3,96
90 DATA 32,13,67,140,255,19,162,0,142,252,
   19,142,253,19,142,254,19,189,0,2
100 DATA 201,32,240,8,201,48,144,7,201,58,
    176,3,232,208,238,189,0,2,240,54
110 DATA 201,32,208,5,172,254,19,240,42,20
    1,34,208,10,72,173,254,19,73,1
120 DATA 141,254,19,104,72,238,253,19,173,
    253,19,41,7,168,104,24,72,24,104
130 DATA 16,1,56,42,136,16,246,109,252,19,
    141,252,19,232,208,197,173,252
140 DATA 19,24,101,22,24,101,23,141,252,19
    ,169,42,32,241,20,32,188,20,160
150 DATA 2,185,185,20,32,241,20,136,16,247
    ,165,116,208,9,165,117,208,5,169
160 DATA 145,32,241,20,172,255,19,96,13,32
    ,32,162,0,173,252,19,232,56,233
170 DATA 100,176,250,105,100,202,240,3,32,
    232,20,201,10,176,5,205,252,19
180 DATA 240,15,162,0,232,56,233,10,16,250
    ,24,105,10,202,32,232,20,170,72
190 DATA 138,9,48,32,241,20,104,96,170,173
    ,0,255,72,169,0,141,0,255,138,32
200 DATA 210,255,104,141,0,255,96
```

■

RUN it right: **C-64;**
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Follow these steps:

1. Copy the VMX and Cash files from the demo disk to your work disk.

2. Load the VMX file with LOAD "VMX",8,1, then type in the SYS 49152:NEW command.

3. Enter the following program, and save it on your work disk with the filename Talker:

```
60000 READN:IFN<0THEN:SPEAK 35:END
60010 FORX=1TO400:NEXT:DATA -1
60020 K$=RIGHT$(STR$(N+1000),3)
60030 J$=MID$(K$,1,3)
60040 IFVAL(J$)=0THEN:SPEAK 0:GOTO60000
60050 J$=MID$(K$,1,1)
60060 IF VAL(J$)=0 THEN 60080
60070 N=VAL(J$):SPEAK N:SPEAK 28
60080 J$=MID$(K$,2,1)
60090 IF VAL(J$)=0 THEN 60140
60100 J$=MID$(K$,2,2)
60110 IF VAL(J$)>20 THEN 60130
60120 N=VAL(J$):SPEAK N:GOTO60000
60130 J$=MID$(K$,2,1):SPEAK VAL(J$)+18
60140 J$=MID$(K$,3,1)
60150 IF VAL(J$)=0THEN GOTO60000
60160 N=VAL(J$):SPEAK N:GOTO 60000
```

4. Load the program containing the Data statements you want Talker to recite, then, in Direct mode, enter:

```
M = PEEK(45) + PEEK(46)*256 – 2:POKE44,M/
256:POKE43,M – PEEK(44)*256
```

Now load Talker and type in

```
POKE43,1:POKE44,8
```

5. Load in the Cash file, using the command FIND "CASH",8. However, be sure you don't type in the Load command.

6. Type in RUN 60000—you'll hear your computer reciting the Data statements to you. Note that Talker only recites numbers from 0 to 999 and the last three digits in larger numbers. Negative numbers end the program.

7. Now, whenever you want your computer to read Data statements, just load the VMX program (step 2), then follow steps 4, 5, 6 and 7. 🅁

—EUGENE COZZI, BARRE, VT ■

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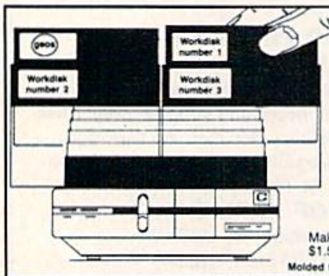

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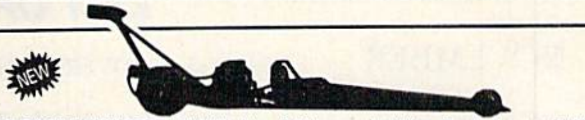

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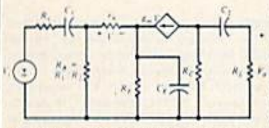

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PUT YOUR MOUSE AND RAM EXPANDER TO WORK—

Do you own a 1351 mouse or 1764 RAM expander for your C-64 or C-128? If not, are you considering buying one? One of *RUN*'s November articles will tell you about available software for these two important new Commodore peripherals.

DOS SHELL—

C-64 owners who perform a lot of file maintenance should tune in next month for our 64 DOS Shell program, based on the powerful C-128 disk utility program.

SHOPPING AROUND—

This program for both the C-64 and the C-128 prints out a comparison-shopping worksheet. Whether you're in the market for a new washing machine, an automobile, a computer or a can of tuna, this program will let you compare product features and help you become a wise shopper.

IN ADDITION—

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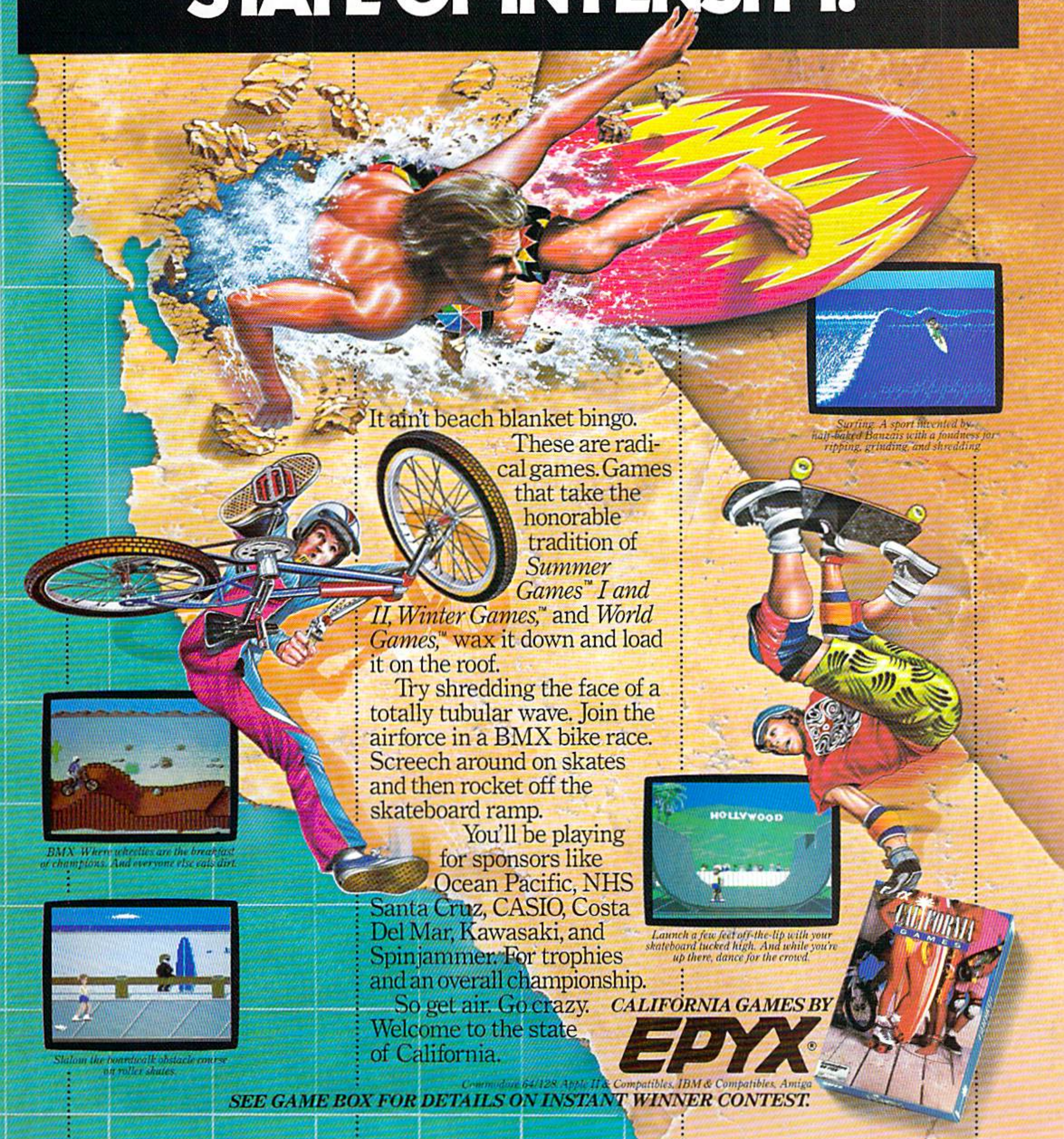

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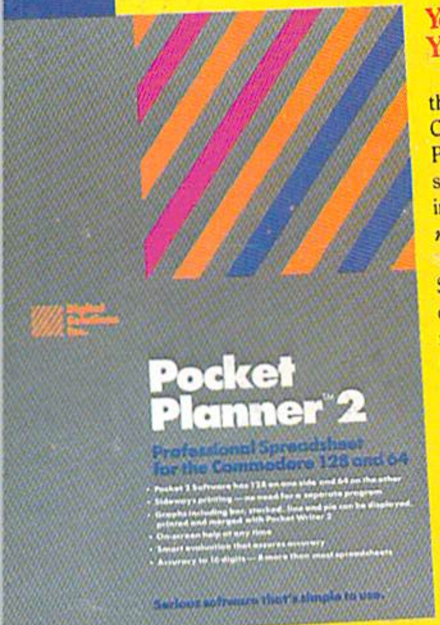
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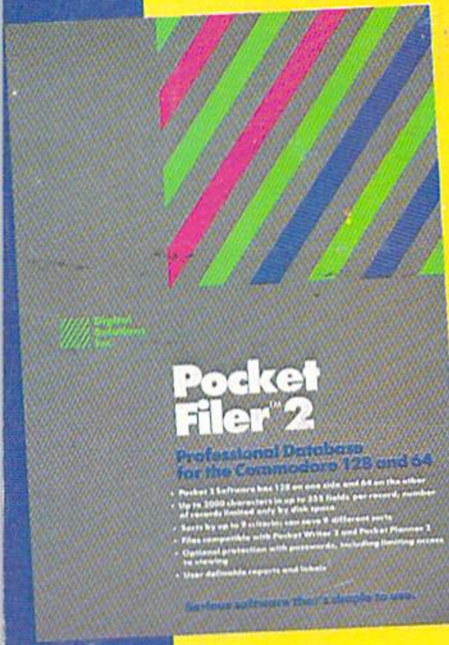
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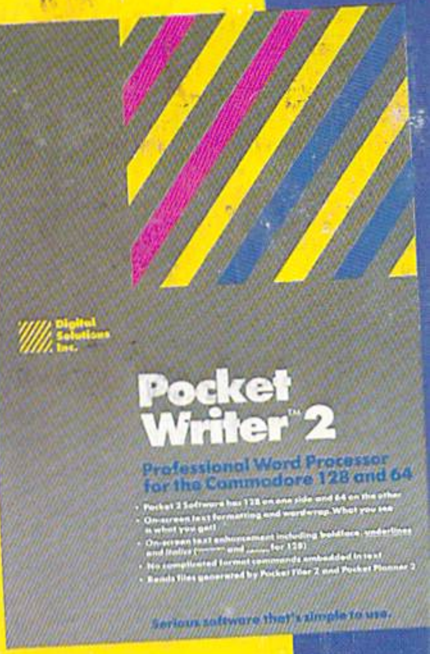
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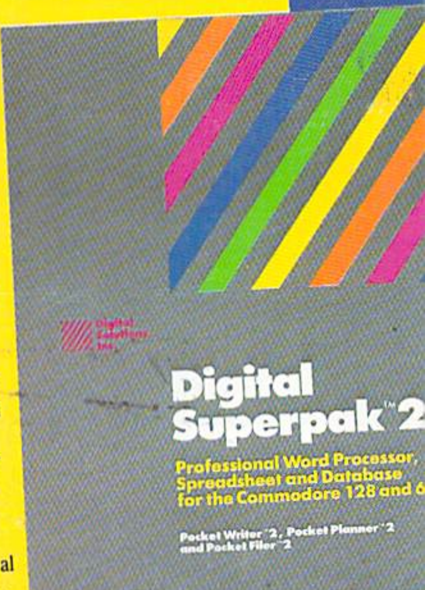
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